The Complete HOUSEKEEPER

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ENCYCLOPÆDIA OF HOUSEHOLD ECONOMY

THE COMPLETE
Housekeeper

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ILLUSTRATED

GARDEN CITY NEW YORK
DOUBLEDAY, PAGE & COMPANY
1917

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Chapter *ONE*

Kitchen Convenience

KITCHEN convenience is the key-stone in the arch of domestic economy which has come in large measure to spell human progress. If one could but make the nation's kitchens all they should be, there would be less need of amendment to its laws. The good red vital blood, from which is evolved winning brain and brawn, is, in the last analysis, good food. Good food in turn depends less on original quality than upon the skill and knowledge of the cook. Notwithstanding, skill and knowledge alone do not avail—there must be strength and proper equipment. Whether the cooking is the work of the house-mistress, or the maid, the best ways of doing it ought to be religiously followed.

The Floor

Like most other things kitchen convenience begins best at the beginning. That is to say, at the floor, which is the foundation of a cook's comfort. The ideal floor is of tile. Like the most part of ideals it is beyond realization by the majority. Next comes linoleum, whose thousand virtues are linked with the single crime of being too costly for at least half the kitchen of the commonwealth. Broad heavy oil-cloth, in tile or mosaic patterns, deserves to rank next, for wear, use, and cleanliness.

Cheap, staring, red-and-white oil-cloth is a delusion and a snare, no matter how dark and dingy the room it carpets. Chiefest among its manifold sins must be reckoned the facts that it shows both wear and dirt quicker than any other floor covering.

A detached, or a cellar kitchen, may be well floored with narrow brick, laid edgewise in cement, and rubbed smooth on top. Such a floor, well oiled twice a year, will not be unwholesomely damp. It is, however, so cold one should never stand directly upon it save in the hottest weather. A stone-flagged floor is among those blunders that are worse than crimes. Luckily it is so rare, it may be left out of account.

Nine kitchens in ten throughout these United States have bare board floors. Hence the question: "What sort of boards?" Nothing soft and sliver-y; neither anything that needs must be painted. The end of a kitchen floor is mainly to be scrubbed—and the paint proof against soap-suds and elbow-grease has yet to be discovered. Consequently a painted floor soon comes to look like a very ragged, and extra-chromatic Joseph's coat.

Narrow boards of heart-pine, well matched, well seasoned, free of sap-wood and wind-shakes, well laid, and oiled afresh every six months, make a fairish floor—the best board floor outside of the hard woods. In the hard woods it is a near thing between oak boards and ashen ones. Oak lasts a trifle longer; ash is the fresher and more sightly. Nothing, indeed, can well be more grateful to the trained housewifely sense than a well-scrubbed ashen floor, with all the grain showing upon the polished flesh-pink surface—a surface that years of good usage only freshen and deepen.

Neither oak nor ash wears appreciably in less than a generation—hence only the first cost needs to be considered. Ash takes a little smoother surface under the

plane, and is more manageable in laying—it should be driven up so tight that the cracks are practically invisible. Oak makes up for occasional roughness by having ever so much more spring. It is also cooler to the feet, and has the crowning mercy of yielding up grease-spots much more readily than ash. Its habit of darkening with age is also to be set to its credit.

Whatever the boards—whether hard or soft, wide or narrow, it is crucial to have them lie even. An edge standing the sixteenth of an inch above its fellows may occasion falls and stumbles innumerable. A creaking board, "a bird in the floor," as country folk say, is little short of a nervous torment. A nail-head projecting ever so slightly is a positive danger. So, too, is a splintered crack. So most of all is a dry-rotted board, the best trap yet devised to catch and breed all sorts of moulds and mildews.

Hence those who needs must put up with hired kitchens may well look to these things: Whether the kitchen floor is firmly laid? Are the cracks in it conspicuous by absence? Does the base-board fit snugly down all round? Are there anywhere cracks, crannies, and crevices, as behind the stove, under the sink, or about the door-jambs, in which mice can lurk, vermin harbour, or such small deer as thimbles, laundry-wax, bread crusts and crumbs, even an occasional potato-paring, can engulf themselves past finding.

It is, of course, the landlord's province to remedy all these things. He will promise—it's usually left the householder to perform. So it is a saving of nervous energy to do it one's self at first hand, even though it be but in makeshift fashion. Do not grudge a few nails to hold the loose board firm, nor the strip of smoothed quarter-inch stuff that closes the yawning base-board crack, neither the putty and plaster which fill irregular crevices —putty on the scouring-line, plaster higher up. Putty

is commonly cheap—three to ten cents a pound. A single pound often works wonders, and five pounds of it is an outside estimate for the most ramshackle kitchen, which may thus be made trimly habitable by the outlay of a few cents. Still it can be made even cheaper than bought ready mixed. Since it keeps perfectly, requiring only to be beaten up afresh with a little oil, it is a handy and valuable thing to have about the house. (See Chapter on Repairs and Restorations.)

A thick springy mat, as cocoa-fibre, corn-husk, woven rope, in front of the sink, will save much wear of the kitchen-floor and the cook's nervous energy. Standing is notoriously among the hardest forms of exercise, ever so much more exhausting than walking, or even running. All the harder if one stands upon a dead unyielding surface. Since a cook needs must stand more than half the time, beyond any other worker, it behooves her to deaden the pressure upon feet and spinal column. The elastic mat is a help. A greater help is a length of the thickest cocoa-matting stretching from the sink to the range, and passing the table on the way. It should not be tacked down, neither left at loose ends to curl and trip the unwary. Have the cut ends clamped fast with strips of doubled tin, beaten flat, and riveted through matting and all. Thus the matting always lies flat, with no possibility of dirt accumulating underneath. It may be cut in squares, or to rug-length—any way, indeed, if the ends are duly tinned. With a roof or back yard available it can be beaten like other rugs. Upon ironing-days, one bit laid upon another under the ironer's feet will save much in power, and, consequently, in time.

Floors are made to be scrubbed. Notwithstanding, the daily, even the weekly, scrubbing, is a fetich that should go. With reasonable care fortnightly is often enough, and where the family is small, once a month may be made to answer. In the matter of grease-spots pre-

vention is much easier than cure. When frying is to be undertaken, lay newspapers all about the range. Take the same precaution upon baking days. Flour is cleanly in itself, but the most insidious of all things. It sticks in the least crevice, and draws to itself all manner of dirt. Lay the newspapers smoothly, two or three ply. If they catch much grease it makes them all the better tinder for lighting the next range fire.

Walls and Ceiling

Since kitchens exist it is plain they must have walls —at least outside the happy tropics where the kitchen wall is the sky-line. As with floors, cost puts tile out of court, also vitrified brick, unless the purse-strings are strong, yet easily opened. Wooden surfaces, either in ceiling or wainscot, are objectionable, in that they absorb dampness and odours, besides affording harbourage to vermin, and lurking-places for dust, visible and invisible. Smooth, hard-finished plaster is far and away better. The plaster should come down almost flush with a plain, well-smoothed base-board, at least a foot wide. Give the wall, base-board, and all a yearly coat of light, fresh-coloured paint. With new plaster wait a year before painting. Otherwise the lime in the mortar will bleach out the colour of the paint.

Many of the patented hard-finishes answer excellently for kitchen walls, but are no more durable, nor hygienic, than the plain, painted plaster. Such walls and ceilings can be washed at need without damage or resulting dampness; further, they do not collect dust, nor absorb odours. Grease which volatilises in a degree from every sort of cooking, and is deposited upon the walls, does not penetrate the painted surface. Hence washing removes it entirely. Indeed, with a well-painted wall, a minimum of care keeps it fresh the year round.

Windows and Doors

A high ceiling helps in ventilation if the windows run up very near it. When the top of the upper sash is two or three feet lower, it is well nigh impossible to rid a kitchen of stale smells. The smells rise with the hot-air column above the range, and spread and hang in the upper air, always twenty to forty degrees warmer than the body of the room. When the fire dies down this warm air cools, slowly to be sure, but enough to let down whiffs of the composite smell, reminiscent of yesterday's breakfast, or last night's dinner. A sash almost flush with the ceiling, when lowered acts as a flue to carry off such exhalations. Failing such a window the low ceiling is best—then the ordinary kitchen stir, opening and shutting of doors, etc., set up a circulation of air strong enough to weaken if not to banish the ghostly smells.

A transom above an inner kitchen-door is a ticklish thing. If it is open every motion below sends waves of hot smell impinging gently upon all the world outside. Heated air expands as well as mounts, and owns, in an aggravating degree, the universal fluid tendency to seek its own level. Bearing this in mind it is easy to see why kitchen-doors leading in should be as low as architecture permits, and outside kitchen-windows run up to the ceiling. With two kitchen-windows it saves wall space to turn one cross-wise, leaving a place beneath for either a closet or an open dresser, and giving more light and air. All kitchen-window sills should be high—high enough at least to have a table set beneath. Thus is convenient arrangement promoted, and the range saved from losing heat through direct draughts upon it. Screen all kitchen-windows, if only with cheese-cloth or mosquito-netting. Wire-gauze is of course much better.

Ordinary crown glass, in medium sizes, is best for kitchen-windows. Then a broken pane can be cheaply

and easily replaced. Both sash and screen-frames should be painted white, particularly where there is a poor light. If painting is out of the question use the quick-lime whitewash, which will stick to even planed wood without flaking, if the wood is first washed clean of grease. (See Whitewash in Chapter on Repairs and Restorations.)

Kitchens need careful fitting in the matter of doors. Sliding doors warranted to slide would be a boon beyond price. Since the average sliding door is built to stick, not to slide, it is better left out of the calculation. Doors giving upon the rest of the house had better open outward. Thus in shutting they force back kitchen smells within their proper domain. Broad cracks betwixt doors and casings can be filled with strips of soft wood, bradded firmly on, and stained, or painted, to match. Cracks in the door itself should be filled with putty, likewise knot and nail holes. Loose panels can be plugged tight with the same useful substance. Warped moulding should be taken off, steamed soft, and fastened in place with brad-nails. Unless the hinges hang true, call in the carpenter at once. See to it that knobs turn easily, and that bolts catch firmly enough to hold at the first shutting.

There are no trifles—least of all in the kitchen. It is only the door firmly shut which will bar kitchen smells from the rest of the house, saving time and nervous energy—which neither mistress nor maid can afford to waste. Therefore, it is well to have outside doors open inward, and further to see to it that they have some protection from the weather. Even a rough hood, with only a broadish step below, is much better than going directly out upon the ground. A screened porch or covered gallery is better still. This, of course, for householders and builders.

For the flat-dweller there is somewhat of comfort in this device. If the kitchen-door opens inward, giving directly upon the hall or dining-room, hang washable

draperies, from a small brass rod, set flush with the outer casing, and as close as possible to the wood, but two inches above the door. Use denim, art linen, or even momie cloth, a length each side. Thus it is easy to pass through, and the curtains falling behind make a sort of air-shield. They need not be unsightly, and a quarterly washing will keep them fresh.

Controlling Kitchen Odours

Odours are subtle, withal searching. In dealing with them an ounce of prevention is worth at least a ton of cure. The heavy smell of stale grease, most clinging and most offensive of all, comes more than anything else from slopping or sputtering over, which a very little care in range management prevents. The acrid smell of burnt or scorched things is positively painful—so much so a cook's first lesson ought to be that fire was given for *cooking*, not burning. Leaving unwashed pots and stewpans to dry and simmer on the range is a fruitful source of ill-odours, easily remedied. Dissolve two pounds of washing soda in a gallon of boiling water, and keep a bottle of it handy. As cooking vessels are emptied pour in soda water an inch deep, shake it well up around the sides, and leave until washing time. If the pots and pans keep warm so much the better—the soda will but do its work the more perfectly.

Onions, turnips, and all the cabbage tribe, which smell to heaven, may have their scent somewhat abated by a little care in the boiling. The odour comes from their essential oils, which volatilise. If the vegetables are prepared some hours before they are wanted, and left to soak in weak, cold, salt water, rinsed, and put over the fire in fresh, cold water, they throw up this essential oil largely in the form of scum. Let them come to a boil before putting in the salt, and skim very clean. After the salt is in

add a dash of cold water—it will throw up a second scum, which must be removed at once. Cook all such vegetables uncovered—a lid strengthens the odour tenfold, and makes it more offensive.

Another preventive is a bread-crust, very hard and very stale. Drop it into the water just as it strikes a boil, and let it stay ten minutes, then skim it out. Most of the oil will come with it—further, the spongy crust will have kept it from vaporising. Cauliflower not quite fresh always smells tremendously. The best thing for it is a scald in weak salt water, boiling hot, before the cold soaking. If the heads are big cut them in pieces so as to make sure of removing every bit of discoloured curd.

Even when summer heat puts an open fireplace out of commission a quick flare, as of straw, excelsior, light shavings, even newspaper, will set up a purifying draught, and help to free the kitchen of unpleasant odours. Failing an open fireplace the kitchen ought to have a range-hood. There are hoods and hoods—at almost any price one chooses, from the big burnished copper affair, which saves the Waldorf-Astoria from cooking smells at a cost of many hundred dollars, to the modest sheet-iron contrivance, which is an integral part of so many among the newest stoves. There is a movable hood, working up and down like the shutter of a roll-top desk, that is, in theory, all a hood ought to be—with something to spare—but in practice has proved much less satisfactory than the stationary ones.

No mechanical contrivance can wholly make up for the lack of care and intelligence in the cook—notwithstanding, it is a fact, that a hood well set, in a large measure, carries away the fumes of food. The manner of setting will depend on the size and location of the flue. The lower edge ought to be high enough to be quite out of the way, yet not so high as to either miss or deflect the ascending hot-air column. It may seem at first

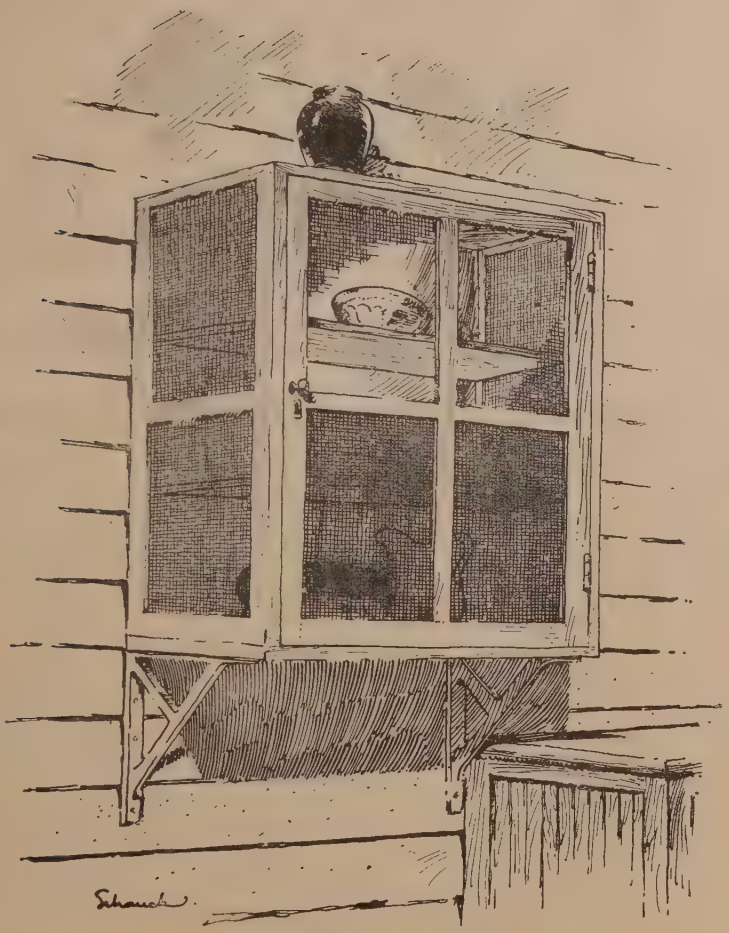
a costly betterment, for no direct material benefit, but a year's use will show the money to have been well spent. Not to name present and every-day comfort, all things keep much better in a well-aired house.

A kitchen with neither hood nor fireplace should at least have a trumpet-ventilator. This is only a tin tube with a widely flaring mouth, crooked body, and narrowed upper end. It should be set in the wall above the range, with the flaring mouth, which curves over and upward, against the ceiling. The narrow end goes inside the flue, projecting just enough to secure a good draught. The efficacy of this device, a make-shift at best, depends mainly upon the size and smoothness of the flaring mouth, and the tightness of the setting in the flue.

A Fresh-Air Closet, Sink, Draining-Board

Take stock of the kitchen intelligently. Consider well its possibilities, then set about realising them. With a hall or porch handy try to put the ice-box there. Give it the best light possible, and as much fresh air. Close beside it fix a fresh-air closet—which, save in the most torrid weather, keeps cooked food better than the ice-box itself. It demands only to be out-of-doors, away from the sun's direct rays. Hence it is as much a boon to the flat-dweller, with a shady fire-escape or north-looking window, as to the people who have houses all to themselves.

Anybody who can drive a nail can make one, at a cost not to exceed a dollar. It is only a framed box, with door and sides of wire-gauze, and shelves across inside. It is best made fast to the wall at such a height as to be safe from prowling cats, and should have further a trusty lock. Put away food in it, in clean earthen dishes, never in any sort of metal, not even silver; slip each dish into a separate cheese-cloth bag, and twist the bag end tight.



A FRESH-AIR CLOSET

"IT IS ONLY A FRAMED BOX, WITH DOOR AND SIDES OF WIRE GAUZE, AND SHELVES ACROSS INSIDE"

If ants, black or red, discover the closet, paint the woodwork all outside with camphor once a fortnight. Twice a year take down the whole contrivance, and scald it outside and in, with boiling soda water.

The range and sink are commonly fixed facts. Make the best of them by a handy location of the kitchen-table. But first a word as to sinks. Refuse to live in the house with anything less than solid cast-iron. The wood-and-zinc abominations, found in many old buildings, breed bacteria enough to the square inch to poison a regiment. The cast-iron sink with cast-iron back is ugly but can be kept clean, and, with reasonable care in the setting, will be wholesome. Further, it can be so painted as to relieve some part of its ghastliness. But it is not to be named along with the porcelain-lined sink, which has a tile backing and invites to cleanliness. The porcelain-lined affair in turn hides its diminished head before the solid porcelain—whose one drawback is its cost. The smallest and plainest are $22.00—thence the price mounts till it is well in the hundreds. But to any born housewife the cost seems a good spending. Certainly such a sink conduces more to family comfort than a Brussels carpet for the parlour, or even a cabinet organ.

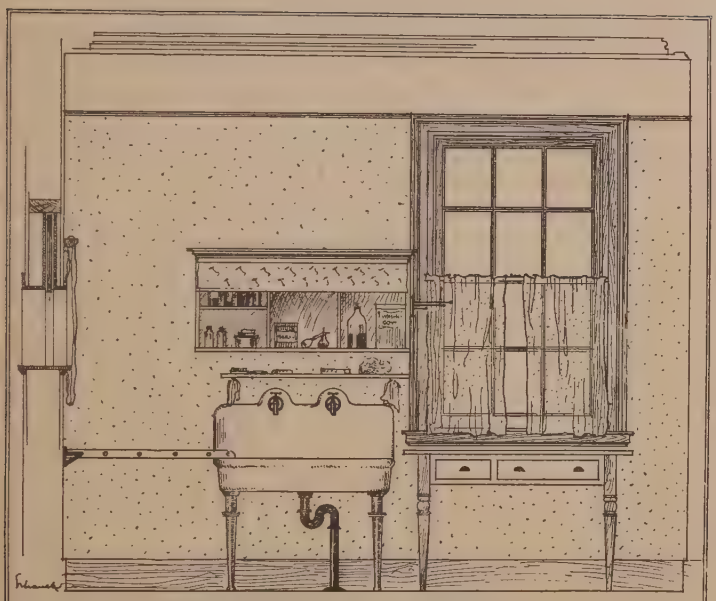
Any sink—always excepting the wood-and-zinc one—is better than none. It should be built in the wall, with the plaster coming so snugly around the back that the most enterprising and venturesome water-bug can find no place to hide. It should stand level upon its legs, but slope very slightly toward the drain, and have all the space beneath open to light and air. Above the sink-back, fasten to the wall a narrowish tray of either wood or metal, with a perforated bottom, and nearly as long as the sink is broad. In this tray keep hand-soap, scouring soap, a nail-brush, a vegetable brush, sponges, etc. In the middle, and at either end, set a blunt hook for hanging wash-cloths. They must neither touch the faucets nor drip

on them. In passing it may be said that a wash-cloth or dish-cloth should be kept spotless. When either begins to fray burn it at once.

Well above the tray have a wall-closet six inches deep, and a little broader than the sink. Keep in it every sort of cleaning stuff—ammonia, soap-powder, dry washing soda, pearl-ash, whiting plate-powder, flannel and linen rubbing-cloths, chamois, and polishing-leather. Bath-brick also, along with lime-water, floor-wax, and furniture-polish. It is well to have the upper shelf divided into compartments, each plainly marked with the name of the thing it holds. Those in daily use should go upon the handy lowest shelf. Doors to such a closet are out of the question—in swinging they strike a grown person either in the temple, on top of, or beside the head. Either leave your closet open—which is not at all desirable—or close it with a roller-door, or curtains running on draw-strings.

The curtain should be of any stout washable stuff, with a slat at the bottom, and tacked across the top to a shade-roller, working in shade fixtures made fast to the closet's upper edge. A regular window-shade may be used, shortening it, of course, and wiping it off inside and out fortnightly. But something opener is much more desirable. A curtain of lawn or cheese-cloth, with draw-strings down each side, is not at all bad. The strings should have long ends, working over a rod across the top. A single pull at them whisks the curtain up clean out of the way. The ends should be joined together and passed over a hook in the bottom of the closet, well toward the back, so as to hold the curtain up.

Hang a roller-towel of generous proportions close beside the sink, and see that the towel proper is changed every day. For dish-towels, provide a fingered rack, made fast to the casing of the sunniest window. Thus the towels get full benefit of light and air, the best of



· PANTRY SINK & DRAIN-BOARD ·

"HAVE A WALL-CLOSET SIX INCHES DEEP AND A LITTLE BROADER THAN THE SINK"

all disinfectants. The cheap fingered racks are commonly too fragile, and the stout ones too costly for kitchen use, but any carpenter or man handy with tools can make an excellent one at the cost of a few cents. All that is needed is square inch-stuff, sawed into two-foot lengths, the corners and one end slightly rounded, with half-inch holes bored in the rounded ends, so the fingers may be strung upon either a wooden peg, or an iron bolt, between two wooden brackets, nailed fast to the window. Such a contrivance may have as many arms as one pleases. Five is a good number. In use they are spread out fan-wise. Out of use they rest peacefully flat against wall or window.

A draining board is a great help in dishwashing. Where it is lacking a big tray with a soft folded cloth, as an old table-cloth, laid over it, is an excellent substitute. The cloth minimises danger of breakage as well as takes up the drainings. It should be wrung out whenever it shows itself sopping wet. A right-hand draining board is most convenient, but it should never be divorced from the kitchen-table or the pantry-window. It saves a world of work and miles of walking to have a sliding-panel window betwixt kitchen and pantry or dining-room. Have the panel big enough to reach the whole arm through—with a table underneath it inside, the problem of putting things away is mightily simplified. Another kitchen problem is where to set the table. No matter what the solution, the solver commonly ends by thinking much might have been said—and done—on the other side. Flat against the wall it permits the hinged bread-board, with shelves above for flour and sugar tins, the lard pail, the cake and bread-boxes, and in the extra space, a wall cupboard, sacred to spices, flavorings, nuts, dried fruit, baking soda, cream tartar, baking powder, yeast cakes, gelatine, citron, what not. There, too, is the place for cake and pie tins, fancy moulds, patty pans, ramekin cases, vitrified china baking-dishes, delicate mixing-bowls,

egg-whips, and custard-spoons. Thus equipped a cook can toss up things almost without moving from her tracks. Notwithstanding, she is haunted by visions of a corner-cupboard possible with the table sitting diagonally out. The corner-cupboard means so many convenient things—shelf-room above for what one will, zinc-lined bins below for sugar, flour, and so on. All these at hand by simply turning about, since the table must stand far enough out for one to work behind it. Where space is plenty the cupboard has unquestionably a shade the best of it. One can stir and beat more energetically, hence more effectually, if there is no need to have regard of the wall.

Ranges, Shelves, and Closets

Fifty years back the most part of these United States did their cooking and much of their heating with wood. The wood-stove, in capable hands, unquestionably turned out miraculously good things. Still, eternal vigilance was the price of them—it was impossible to count certainly upon more than ten minutes of steady and equal heat from the best of them. So it is matter for rejoicing that the coal-range abounds, the gas-range is cheap, plenty, and effectual, and the oil-stove has ceased from smelling vilely, and gone regularly into business. As to choice betwixt the three, for a medium or large family, with laundry work done at home, a coal-range is best throughout eight months of the year. Throughout the other four it is a refinement of cruelty to keep the kitchen and the cook's temper at simmering heat, with the thermometer playing acrobatic tricks the while. A very little money will provide an oil or gas range, either of which anybody can learn to manage in half an hour. Comfort wholly aside, either will save its cost in fuel the first season. Coal once afire must burn on. If it is

dumped the cinders are ill and costly to re-kindle. With oil or gas contrariwise, matches are the only kindling, and no more need be burned than just suffices for the cooking. Moreover, it is unnecessary to heat the whole range to make tea or boil eggs and coffee.

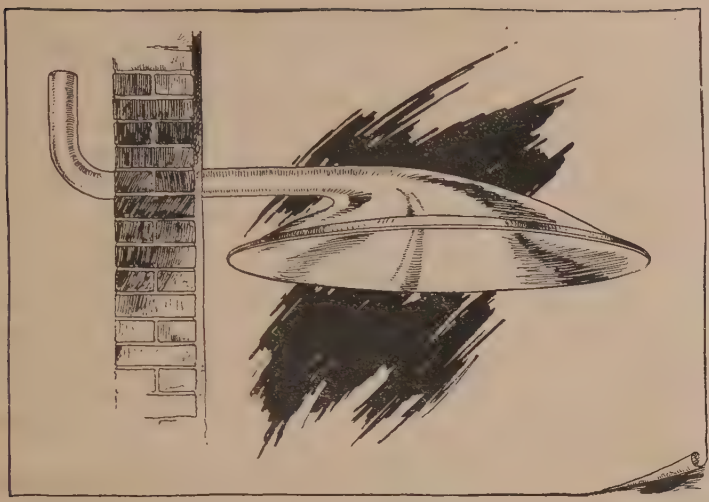
The cost of cooking with oil depends upon the local price. In a general way it is safe to reckon that a gallon of good oil will keep a blue-flame burner of the highest power going at full head for nine hours. With reasonable thrift, three to four gallons of oil ought to do a week's cooking, besides boiling clothes and ironing a moderate wash. Gas is a trifle more convenient, and in places cheaper, but everybody cannot burn gas. Oil has literally the world for its parish—even the Great Desert and the remote Klondike.

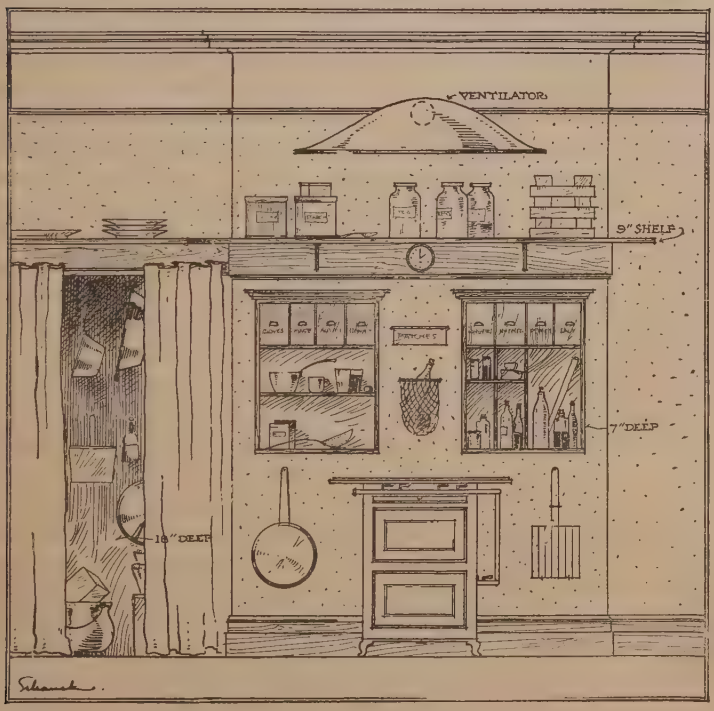
Concretely, the range, whatever its breed or pattern, is the most potent factor in kitchen convenience. Sometimes it lurks in a recessed chimney with a boiler standing stark at one side and a wall running up on the other. Then the cook has need of patience and commonly deserves a martyr's crown. Oftener it is thrust in high relief against the chimney-breast or set a little way off the wall, with the pipe running well up toward the ceiling. Either way, it is unlikely the kitchen makers and builders saw fit to do more than leave bare wall behind it. Right there opportunity offers, since nowhere else is space of so much value. Begin to utilise it with a broad shelf all the way across, as high up as one can reach. If the pipe interferes have the shelf cut out to accommodate it—of course taking care not to let the wood come close enough to be in danger of scorching. A shelf fifteen inches wide, well and stoutly braced underneath, will hold the things that need to be kept warm and dry—as rice, cereals, beans, starch, bar-soap—it goes a third farther for hardening—vinegar, salt, pepper in the pod, crackers, bread-crumbs in glass jars, tea, and

lump sugar. All but the soap should be in tin or glass and plainly marked. Pile the soap-bars cob-house fashion and do not cover them. Hang a light, cheap clock from a screw-hook set underneath—thus, at a glance, everything can be timed in the cooking.

Below the big shelf, upon the side next the sink, have three narrower shelves, with a roller-door. There keep all the light kitchen artillery, sauce-pans, skimmers, strainers, flesh-forks, larding-needles, cake-turners. Over against these three shelves, upon the other side of the range, have a cabinet, cut into spaces for all sorts of condiments and flavourings. Label each compartment and keep everything in place. The flour-dredge belongs there, the salt-shaker, the pepper-casters, tarragon vinegar, onion-juice, garlic in clove and in essence, celery-salt, fine herbs duly powdered, mushroom, walnut and tomato catsup, paprika, tabasco, capers, and gherkins for garnishing, port wine, sherry, claret, and brandy; mustard, dry and made, grated horse-radish, and grated cheese. In the compartment next the range set a graduated measuring glass and three box-wood spoons—salt, tea, and dessert sizes. Seasoning over the fire, which is one secret of delicate flavours, is easy to a cook thus equipped. The cabinet should have a roller-door like the shelves. In the bottom of both shelves and cabinet there ought to be blunt screw-hooks for hanging holders of all sizes. It is a heart-breaking choice betwixt burning a hand badly or spoiling some especially dainty dish by five seconds over-cooking.

With a gas-range fit into the space between shelves and closet the biggest double match-box obtainable. Matches are ever so much cheaper than gas. Jets should be extinguished when not needed, though they may have to be relighted five minutes after. Good matches, and beautifully plenty, are essential to peace and a quiet kitchen. So is a holder for burnt matches. Most of the





RANGE WITH SHELF AND CUPBOARDS
POT-CLOSET TO LEFT

ready-made match-safes are so ridiculously inadequate it is well to have the plumber or tin-smith make something approximating, in metal, the pocket shoe-bags of our grandmothers.

Somewhere on this back wall contrive a space for a wire bottle-rack in which to set the bottle of soda-water. It is a friend in need and deed, first, last, all the time since it helps so largely to keep the sink clean and unclogged. Once a week a whole bottleful ought to be poured down the sink-drain after dish-washing is over. Chain dish-cloths need a scalding in soda-water at least once a month.

A movable dresser is desirable, but lacking it shelves across either a corner, or the recess beside a chimney flue, answer excellently. Have the lowermost shelf twice as broad as those above, and hang a washable curtain from it. This gives a good pot-closet. Fill the open shelves with platters, bowls, brasses, indeed whatever ware belongs specifically to the kitchen.

Whatever else it may lack a kitchen should have one comfortable chair, and a smallish solid-standing table with one or two drawers. Set both as far from the range as light and air permit. The table is for cook books, account books, receipt books, a work box, shears, tape, and binding twine. Fasten a small slate to the wall just above the table, and hang a bit of pencil to the frame underneath. The slate is a kitchen record—for things to be bought, things in need of special attention, hours of extra serving, time of putting things over the fire—indeed it has uses too numerous to specify, and is as much a help to the mistress as the maid.

A chiffonier or clothes-press is handy to have about a kitchen, if there is room for it. Have one drawer for caps and aprons, another for dish-towels and holders, a third consecrated to jelly-bags, pudding-bags, roly-poly and tamise cloths. All of these last ought to be soaked in

tepid water an hour after using, then well washed, boiled, thoroughly dried, and aired for a day before putting away. Never use either without scalding it well, then swishing rapidly for a minute or two through clean cold water. Pudding-bags and the like must in addition be well floured. The corners of them must be rounded, the seams strongly sewed, bound with white tape, and left outside in the boiling. Nets are better than cloths for boiling dumplings. Treat them the same as cloths, or they will grow musty.

Chapter *TWO*

Repairs and Restorations

MAKE haste slowly in the matter of repairs and restorations. It is not meant by this to let the work drag, but never to undertake it until everything is ready, nor to lay a hand to it amid a press of other work. Movables in need of repair, as chairs, tables, picture-frames, broken china, bric-à-brac, and so on, ought to be gathered into a place apart, where they can remain undisturbed until their hurts are healed.

Every household, no matter how small, will be better off for possessing this outfit of tools: hammer, tack-hammer, hatchet, hand-saw—fine rather than coarse—screw-driver, monkey wrench, brace and assorted bits, pliers, wire-nippers, gimlets in three sizes, foot-rule, square, small plane, small trowel, putty-knife, and two or three brad-awls. In addition, it pays to keep always on hand wire nails, assorted sizes, screws from half an inch to two inches, light bolts and taps, screw eyes, screw hooks —these are best of brass—picture hooks, picture wire, sand-paper, putty, plaster of Paris, Spanish whiting, brad-nails, rivets, a soldering iron, and a pot of glue. Ten dollars at the outside, carefully expended, will supply everything mentioned. Often the investment may save a hundred in course of a single season. Especially if the investor lives in the country or the suburbs, where repair men are commonly so full of business, it makes them

high and haughty, withal, disagreeably independent. Even in city homes the repair-kit is handy to have about the house. To the flat-dweller it is a positive boon, since it makes one in large measure independent of autocratic janitors, besides saving much in money and worry through the proverbial stitch in time.

Lime, another essential of most repair work, is best bought as it is needed. It will air-slack no matter how dry it is kept, and quick-lime is ever so much more effective. Either dry, or in the form of whitewash, it is the cheapest, best, and cleanest, thoroughly safe disinfectant. Every underground space needs a yearly coat of it. An earthen cellar-floor ought to be whitewashed the same as the walls, and, when dry, covered with loose plank wherever there is need to walk or stand a long time. To leave the floor untouched is to invite and harbour all manner of taints. Cellar whitewash must be as thirsty as possible; thus it helps to keep the cellar air clean and sweet. There are as many ways of making whitewash as of foretelling the weather. This is the best way, if it is to go underground.

Cellar Whitewash

Tie a gallon of wheat-bran loosely in very thin cheese-cloth, and boil it for five hours in five gallons of water. As the water boils away, add more. Take out the bran, squeezing it well, and dissolve in the boiling size two ounces of carbolic acid. Stir well, then put in a gill of liquid Prussian blue; stir again, then add half a peck of unslacked lime. Stir, strain through a coarse sieve, and apply hot. It is best to take out a gallon at a time, leaving the whitewash-pot where it will keep hot but not boil. In applying to wood, move the brush with the grain wherever possible. Do not try to whitewash a very greasy spot without scouring. The wash will cover it

up, but in a week will begin to flake and crumble. Walls previously whitewashed need to be swept very hard with a stiff broom so as to remove all loose flakes. Brick-work or rock will take twice as much whitewash to the square yard as wood. It is poor economy to scant or skimp, especially at cracks or along seams of rock-wall. Have two brushes, one long-handled, one short, with a stubby round paint-brush, for use in crannies and tight corners. Grease the hands very well before beginning to work, and protect them further with gloves of leather or rubber, coming as low as the fingers. Whitewash from the top downward, and, in working upon the ceiling, keep well back of the brush, on pain of getting a splash of whitewash in the eye.

Out-Door Whitewash

This is excellent for fences, walls, out-buildings, sheds, trellises, rough porches, or orchard tree-trunks in need of protection from vermin. Break up a pound of clean glue in an earthen jar, cover it well with cold water, and set the jar in a vessel of boiling water. Keep the water-bath simmering until the glue is all dissolved—it should be clear, and rope slightly. Next morning heat it well, then stir it through six gallons of hot water. Add a pint of salt, and when it is thoroughly dissolved pour the liquid, boiling hot, upon one peck of unslacked lime in a clean wooden vessel. Stir hard for ten minutes. Add a little Prussian blue if wanted a clear white. Two ounces of chrome-yellow rubbed smooth in a cup of the wash, then well mixed with the mass, will give a lively cream-colour. Lamp-black sifted in makes gray, dark, or light according to quantity, and Spanish brown gives a dull pink, but requires to be carefully mixed, or it will stay in lumps, and give a spotty colour. This whitewash will stick either hot or cold, and keeps well for some time.

It is much better to put it on on a clear, warm day than one either cloudy or damp. Once the glue dries and takes firm hold it is not easy to get it off, but, unless it dries quickly, it will neither look nor last its best.

Milk Whitewash, or Quick-Lime Whitewash

This is a good substitute for white paint inside the house, since it sticks to wood, planed or rough, and rubs off very little. Powder and sift quick-lime without slacking, stir a quart of it well into a gallon of sweet milk. It ought to be a little thicker than cream. If too thick, add more milk; if too thin, more lime. After mixing thoroughly, add a teacupful of turpentine, stirring hard as it goes in. Apply with a paint-brush. This is excellent for ceilings, upper walls, the inside of kitchen closets, pantries, dairies, and so on. It can be tinted like the out-door whitewash, but is of so soft and clear a white it is more agreeable without colouring.

Prepared kalsomine cakes are so cheap, and so easily bought, it seems hardly worth while to say that the dissolved glue, with the addition of Spanish whiting—sifted, of course—and an earth-colour in powder, makes a kalsomine finish for walls. Apply with a paint-brush, and give at least two coats. Three will be better. For the first, thin the liquid kalsomine one-half with water just below boiling heat. Let this coat dry, then put on a coat of thick wash, but without colouring. Colour the last coat, and thin it a very little. It is best to try a brushful upon a shingle or waste-wall before finishing, as the colour lightens so in drying it is otherwise impossible to judge accurately the depth of the shade.

Step-ladders are kittle-kattle when it comes to working with a ceiling or upper walls. Given space to store

them, it pays to have a pair of light trestles, a little more than waist-high, and three long boards, a foot wide each, to lay from one trestle to the other. This makes a safe and handy scaffold. In default of it one may make shift with two light barrels, set on end, with a stout ironing-board laid between. By looking before stepping one can use the make-shift scaffold with no risk at all. Whiten a ceiling in strips the long way of the room, moving the brush up and down in straight strokes, and taking care not to leave a rough place where the new stroke joins the one previously made. This is relatively easy with a scaffold, but almost impossible upon the confined footing of a step-ladder.

Painting Walls and Floors

With a can of good ready-mixed paint, painting walls and floors is no job at all. Paper-hanging is a little harder, but by no means beyond the strength or skill of an average woman. Putting up textile hangings, as burlaps, denim, cretonne, requires only a little knowledge, and something of knack. But, first, the walls themselves must be made sound and trig. Except for a painted wall, plaster is a better stop-gap than putty. Paper does not stick well to putty, and the oil in it comes through any sort of cloth. Sift plaster a pint at a time into a clean bowl, mix it with cold water to a very soft dough; fill all the broken spots in the wall with this dough, and smooth each as filled with either a small trowel or a broad-bladed knife dipped in cold water between strokes to keep it from sticking. Work quickly, so the plaster may not set until it is in place. By mixing it thus in small quantity it can be used up clean. With big breaks it is best to mix fine sand and quick-lime in equal quantity, through the plaster, wet with hot water, apply to the wall in handfuls, and smooth before it sets by laying

on a bit of board, and hammering the board lightly until the mortar is flat with the rest of the wall. Before painting the mended spot let it dry a day or two, then brush it well over with strong vinegar, to neut alise the quicklime and save the paint from discolouration.

Always cover a floor with paper, old cloths, boards, even straw, before beginning to work at painting or whitewashing. It is a trouble that saves very much worse trouble. In using paint ready mixed, always shake the can well before pouring out any. The colour settles by standing. Unless it is thus shaken up the bottom of a can will be three to four shades darker than the top. Thin paint, too thick to spread well, with turpentine and linseed oil. Boiled oil is best—two-thirds oil to one-third turpentine is a fairly good proportion for indoor work. Stir the paint-bucket hard before putting a brush in it, and try a stroke or two on a board to make sure it is right for the wall. A blotch in the beginning is a hard thing to paint out; besides, it confuses the eye. Upon new walls the priming coat should be very thin, barely enough paint to colour the oil. If it needs to dry quickly put in a good deal of turpentine, and leave doors and windows open day and night. Apply the second coat of full thickness, and do not try to dry it out with turpentine. Time alone gives paint a dependable surface. In repainting, wash the wall well with soda and pearl-ash, and let it get thoroughly dry. Otherwise the grime and grease will streak the new paint, or, if very thick, show through it and make it flake.

A regular coat of paint, especially one grained and varnished, can only be burned off; hence, no amateur ought to undertake it. But stained and varnished wood, or even varnished paint, much defaced, can be recoloured unprofessionally, though it is troublesome work. The surface must first be washed in turpentine to soften the varnish; then, after an hour, in alcohol, to remove the

bulk of it. Then comes a washing in strong pearl-ash, rinsing, drying, and sandpapering. All this will leave a surface mottled and not coloured, but readily receptive. Notwithstanding, it is hardly safe to try making it a new colour more delicate than the old.

Reliable Stains for Wood

Prepared stains are cheap and convenient; the trouble with them is they are seldom mixed in oil. Thus the colour is washy, and fades, instead of deepening with age. Hence it seems worth while to give the following receipts for stains, all of which may be used on any wood, unpainted, or brought to a taking surface, but all of which likewise give the best results upon pine and white wood clear of knots.

Cherry Stain: Half-gallon raw linseed-oil, half-gallon spirits turpentine, mix well with one ounce Indian red, try a little on the wood to be stained, and if too pale put in more colour. Keep trying until the right tone is found; some wood takes colour much easier than other sorts. The stain must be a true stain, thin enough to let the natural wood-grain show through. Give one or two coats according to the depth required, and finish by rubbing lightly with sandpaper, then giving a single coat of colourless shellac varnish.

Mahogany Stain: Mix as for cherry stain, using a little less Indian red, and adding as much burnt sienna. Put in both colours sparingly, trying the stain between times, until sure of the shade wanted. The more sienna, the duller and softer will be the tone. If too deep, add more turpentine and oil. Fresh wood will take up from half to two-thirds more stain than that which has been painted or oiled. With very porous wood, or where the grain is rough, it is worth while to use a filler, and rub down with sandpaper before applying the stain.

Oak and Walnut Stain: Raw umber mixed with the oil and turpentine gives oak colour; burnt umber, walnut. Antique oak-finish comes from rubbing over with a mixture of one part raw linseed-oil, two parts turpentine, a little burnt sienna, and just enough lamp-black to colour well. This is best put on with a sponge or woollen rag, and rubbed in and off, as applied. It must be thin enough not to show black except in the grain-lines—the hard ridges ought not to take it up. Since it is very hard to achieve this result on soft wood, antique oak is not commendable save for genuine oak-wood.

Filler for White Woods: Mix through half a gallon of the oil and turpentine, half a pint of sifted cornstarch, and half a pint of sifted whiting. Stir well, and apply all over the wood. Let it dry before putting on the stain. For dark wood mix well through the filler a tablespoonful of burnt umber or burnt sienna. Wood or anything to be treated with stain or filler must first be made absolutely clean.

Restoring Wood, Wicker, Etc.

If wicker furniture has been varnished it will not take enamel without removing the varnish. Pour boiling water, with a little washing-soda in it, over and through the wicker-work for at least ten minutes; let it dry, go over it with a flannel wet in either turpentine or naphtha. Leave in the air, and next day rub down with sandpaper. Wicker, rush, and bamboo things are better dyed than painted. A good black dye is made by dissolving half a pound of logwood extract in three gallons of water, and, after it boils well, adding four ounces of blue vitriol dissolved in a quart of water. Boil ten minutes longer, skim well, and apply boiling hot with a very thick soft brush. If possible, hold the thing to be stained over the boiling dye-pot while the staining goes on. If the first

coat is not deep enough, boil down the dye one half, and give a second coat. Let dry two days, then scrub well with a stiff brush and strong tepid soap-suds. This ought to prevent smut. After drying, the black can be varnished, oiled, or treated with wax, or with furniture-polish.

Unpainted wood or raw wicker can be dyed almost any colour with good domestic dyes. Red is particularly effective. Wet the surface to be dyed with clear hot water before dyeing. The wetting makes it take colour evenly. For white enamel a clean dry surface is requisite. Use pure white lead, the best-boiled linseed-oil, and white varnish. Put just enough lead to colour the oil in the priming coat. Let it dry three days; then at like intervals give three coats of white lead, mixed very smooth, and each a little thicker than the last. The finishing coat should be thicker than rich cream, and put on very smooth. Give two coats of the white varnish, rub down with sandpaper, and finish with oil applied with a silk swab, and rubbed to a high polish. Beware of dust. Unless the work is covered while the coats are drying, it is likely to come out more gray than white.

Sun-faded spots in stained wood, as a floor or window-casing, can be restored thus: Cover the spot with a folded cloth wet in benzine or turpentine, let it lie an hour, then rub over with alcohol, and wash with strong soda-water about blood-warm. This takes off the old varnish. Stain afresh, taking care that the new colour goes out quite to the old; let dry, revarnish, and polish.

How to Make and Use Putty

Fill all shrunken seams in wood, or cracks, or crannies, or crevices with putty before beginning to paint or stain. Old putty, kept over from former repairings, may be softened by beating it gently, and dropping in oil as it is beaten.

Notwithstanding it often pays better to mix it fresh, it is never quite so manageable after reworking. The mixing is very simple. Sift two pounds of whiting into an earthen bowl, make a hole in the middle, and pour in gradually, stirring and pounding all the time, enough raw linseed-oil to make it the proper consistency. This is another point in favour of home-mixing—it can be stiff, or soft, at need.

For deep and wide floor-cracks it ought to be as stiff as biscuit-dough. Do not try to fill a crack that can be seen through without first putting in a sliver of wood thin enough to come half way to the top. Nail the sliver every foot or so with the smallest-size brads, set diagonally first one side, then the other. Then cram the crack full of putty and smooth off the top, but take care in the smoothing not to smear the wood either side, nor to leave the putty higher than the floor. Without the wood at bottom, walking breaks the putty almost as soon as it hardens, and grinds it through, thus leaving the crack's last estate worse than the first. An open crack too narrow to get in a sliver ought to have the fine brads driven in each side and left with the heads standing out, crossing each other a little below the floor-level, before the putty is put in. It will harden all round them, and, even though it may break, stay in place a long time.

With putty much depends on knowing how to handle it. For filling longitudinal spaces—as seams, cracks, split places, shrunken panels—take a ball of putty the size of an egg, and roll it between the palms until it forms a long worm-shape. Make the worm as near as possible the same size all the way, and of a thickness proportionate to the space it must fill. Press it firmly in place; then with a blunt, broad-bladed knife run over it hard, level it, and smooth it, scraping off the surplus.

For filling nail-holes, or knot-holes, make a thickish worm, lay it flat upon a smooth board, and cut it into

bits. Press a bit into each hole, and smooth off with the knife. Be careful, always, not to smear; also to leave the surface level. With very soft putty it may be left a little higher than the wood, as it will shrink a bit in hardening. With many smallish cracks to fill it, it pays to use a putty-tube. Make it of either stout tin-foil, or oiled paper. Double a square to form a cornucopia, fasten it firmly; then half fill with soft putty, snip off the pointed end very slightly, and squeeze the putty through it. If the stream is too small, snip a little more, but beware of getting it too big. With care a tube can be refilled many times. Begin at the end of a seam, and squeeze the putty into it, moving slowly, and keeping the worm even. If the seam is irregular, thicken the worm in the big places by moving the tube more slowly, squeezing a little harder the while.

With window-glass of the proper size, filling a broken pane is a small matter. First break out the old pane's remnants, working the bits from underneath the putty. Then a few taps with the hammer-head will break the putty so it can be easily removed. Scrape the sash-edges clean, and, if possible, take out the sash and lay it flat, putty side upward. Fit in the new pane, and drive a very small tack in the middle of each side, with the head projecting so as to hold the glass firm. Then put in glaziers' points all round—that is small, sharp triangles of tin—with the points pressed into the sash, and the sides flat against the glass. Lacking the points, put in two more tacks on each of the four sides. Drive them in far enough for the putty to cover the heads. Lay a roll of putty along one side, smooth and shape it with the knife, and be sure to leave it no wider than the shoulder of the sash; also not to blur the glass. Finish one side before touching putty to another. The second day after putting in, paint the putty well with white lead, rather thinly mixed in oil. Putty is at first wholly im-

pervious to water, but, left unpainted, weathers in a few months, and begins crumbling away.

In closets and pantries it is a very present help against the inroads of crawling things. Wherefore it is well worth while to cram and crowd every crevice with it. Then, if the putty itself cracks, put in more. It sticketh closer than a friend or brother, and is more subtle than even a cockroach or a water-bug. In the bath-room it works wonders, and is safe to use as it does not absorb moisture, neither odours, save in a very slight degree.

Paperhanging

Paper will not stick either to a painted wall or to one finished white or whitewashed. Or, rather, it will not stick serviceably unless the wall is properly prepared. Painted walls must be washed clean and well sized.

Whitewashed walls need to be dry-scrubbed with a very stiff brush, then washed in very strong alum-water, or else strong vinegar, and after drying three days, to get a vigorous sand-swabbing. The sand-swab is a pint of sand tied up in stout double burlaps. If the swabbing leaves the surface still lime-dusty, go over the wall again with vinegar or alum-water almost boiling hot. Apply it with a thick paint-brush, and be sure no space escapes wetting. Unless the lime is thus neutralised with acid it will make the paper crack, and pop off the wall. Hard white finish is nearly as bad as whitewash. It is unsafe to paper either, even after washing and scraping, without first putting on one or two coats of size. Make the wall-size of wheat-bran or glue, as directed for whitewash. If of glue, thin it one half with vinegar, and put on boiling hot.

It saves much work to have wall-paper trimmed in the shop where it is bought. Dealers commonly do it without charge. Have the left-hand selvage cut. With a

figured paper, begin either at the top of the wall or the picture-moulding, and measure to the base-board, but, before cutting a length, look at the figure. If by cutting an exact length the pattern comes off so as to match the upper end, well and good. If it does not so match, raise the first length until the bottom line cuts a pattern-figure exactly in half. Thus, by wasting six inches in the beginning, it is possible to save a roll or two if the room is large. Cut a dozen or twenty lengths matching the figure accurately to the first, and taking great care that the pattern shall run straight across the wall. Nothing looks much worse than a papered wall with the design running askew, six inches higher at one end of it than the other, although the ascent may be so slight every figure appears to match.

The safeguard against that, after accurate cutting, is to start square. Corners are rarely true, and door and window-casing are often out of plumb, especially in old houses, or new ones still settling. Before beginning to hang the paper, strike a plumb-line with chalk from top to bottom. That is to say—hang a compact weight by a cord, dipped in powdered chalk, flat against the wall, with the upper end of the cord at the ceiling and the weight resting against the base-board. Hold both ends fast, then draw the taut cord out smartly, and let it strike the wall. It will leave a mark entirely true. Set the first length by this mark; then, if the ends are level, the figure must run right.

Lay the cut lengths one on another, wrong side up, upon a scaffold a little wider than themselves—here again the boards and trestles come in excellently. Cover the top length with paste throughout, then fold it back upon itself, accurately in half, lay it off, paste and double the next. Do not paste more than half a dozen at once—the paste dries; besides, the paper gets tender. Set a step-ladder in front of the plumb-line, and stand on it to

put on the paper. Take a folded length, with the upper end between the thumbs and fingers of each hand, having first separated the ends for perhaps six inches. Apply the upper end firmly to the wall, keeping the trimmed edge true with the mark. Spread it smooth, then deftly unfold the length all the way down, press the upper half of it firmly in place, then step down and affix the lower half. Now with a soft cloth in each hand go over the whole length, pressing outward from the middle to the sides, so as to remove all blisters. If an obstinate one remains near the middle, prick it with a coarse needle, and pack the wet paper down hard all round the puncture. Be specially careful not to smooth blisters into wrinkles. Wrinkles look ill in themselves, but do worse harm by drawing edges out of plumb.

With a frieze and dado, the paper lengths are handily short. Cut the frieze in lengths of about four feet, make them very pasty, and be sure to match the figure perfectly, if figure there is. If the cove adjoining the ceiling is to have a separate paper, cut it exactly the right depth before paste touches it. At notched door or window-casings let the wet paper lap far enough to break out the projections. It may seem a waste of paper, but paper is cheap in comparison with strength and trouble.

Papering a ceiling is not a nice job even when the ceiling is low. Still, it can be done if one is willing to take pains. Cut the lengths to fit, also to run the shortest way of the room; do not fold them after pasting, but raise them single upon the hands, stick them first near the middle, and work them on toward the ends. If the frieze-paper meets the ceiling, put on the ceiling first, and let the ends lap down upon the wall far enough for the frieze-lengths to take hold on them.

It is never safe to paper a ceiling over an old paper. The two will crack, curl, and sag after a little while. Indeed, it pays to take off old paper even from walls, al-

though it is a tedious job, withal troublesome. If the room is to be repainted, and can be emptied of everything, a good way is to spray the walls and ceiling freely with hot water from a garden atomiser, then close windows and doors tight, and set an open vessel of water over a lighted oil-stove in the middle of the floor. After several hours the steam will have so softened and loosened the paper, it will come off in big sheets. But where the steaming is out of the question, one must rely upon sprinkling with the atomiser, and scraping. A light, sharp steel garden-hoe is about the best scraper. In scraping a ceiling it is well to wear big glasses, as a fleck of the wet paper, striking full in the eye, may prove a serious matter.

Paper Paste

Paste is best made fresh every day or two. Put on a gallon of water in a two-gallon open kettle, add a heaping tablespoonful of salt, and set it to boil. Mix two heaping teaspoonfuls of flour gradually, with enough cold water to make it a little thicker than cream. When the water boils, pour in the flour, stirring hard all the time so there shall be no lumps. Drop in a lump of tallow as big as a walnut, cook for five minutes, then add an ounce of alum dissolved in a cup of boiling water. Properly made, this needs no straining. If there are lumps, strain it before using. Apply to the paper with a flat broad brush, soft and thick. If the paste must be kept over a day or two in hot weather, a few drops of oil of cloves will keep it from souring.

To Clean Papered Walls

A mop of cheese-cloth strips, an inch and a half wide and eight inches long, made fast to a light handle is the best thing for keeping a papered wall clean. Brush the

paper well with it twice a month. Every spring and fall mix cornstarch, whiting, and powdered Fuller's earth in equal parts, dip the mop into the powder, and rub walls and ceiling well with it. Then shake all powder from the mop, cover it with a damp flannel, and go all over the wall again, wiping in long straight strokes. The flannel must be only damp. Wet, it is apt to leave marks. As soon as it is dirty, change it for a fresh one.

Thick crust-slices from a very stale loaf will also clean wall-paper. Begin at the top and rub downward with long, steady strokes. It is a good way to cut a square loaf in two, lengthwise, rub with it till the cut surface is soiled, then slice the dirt off. Fuller's earth mixed to a thin paste with ammonia, and let dry over grease-spots, will usually remove them. Brush off the dry paste with a clean stiff brush. For very delicate paper, fold powdered French chalk flat inside a thickness of gauze, lay the chalk-pad against the grease-spot, and press well with a blazing-hot iron. Properly managed, there will be no mark left. But where there is a big spot, the best way is to cut the paper square around it, wet, and scrape off; then put on a new piece, matching the wall-pattern accurately. There should be an extra roll saved over from every room for just such work.

Spots in Wood and Metal

Faded spots in hard wood, from heat, light or the touch of too strong alkalies, can be brought back to their original colour by repeated gentle rubbings with boiled linseed-oil, mixed with one-eighth of alcohol. Rub two or three times each day, using a clean silk or linen swab each time. Old linen and flannel ought to be kept for such uses, as well as old silk, which also makes the best of all polishing cloths. Make swabs by rolling fine cotton-batting into tight small balls, and tying a ball in a square

of cloth. The loose cloth-ends form a handle. Throw away swabs as soon as they get hard or dirty.

For polishing marble, stone, and metal dry, use a lead swab. To make it, cut a circle of stout unbleached muslin eight inches across, and gather it around the edges with strong thread. Pour into it a pound of the heaviest duck-shot, draw, and sew the gathers firmly. Tie the shot-bag inside a leather square to rub with it. The leather can be used on both sides before it will need washing. The shot-bag lasts indefinitely.

Dents, spots, and scratches upon cabinet wood torment the housewifely conscience. To remove a dent, cover it with four thicknesses of wet paper, and set a blazing hot-iron on the paper for a minute. The steam will raise the compressed wood-layers, though it may play hob with the varnish. Repeat the steaming until there is an even surface. Then sandpaper the place, rub off well with alcohol or naphtha, and revarnish. For a rubbed place, sandpaper it smooth, then swab lightly with paraffin oil, and afterward with a little dry colour, the same as recommended to make that particular wood-stain. Put on the merest suspicion of the colour at first, use a clean swab, and repeat the oil-rubbing in between until the right shade is produced. Finish with a coat of shellac varnish, very lightly rubbed until dry.

A scratch that goes no deeper than the varnish may be helped always, and healed sometimes by holding a red-hot poker an inch above it for the space of half a minute, and rubbing well, as soon as it cools, with a mixture of alcohol, olive-oil, and pure cider-vinegar in equal quantities. This makes a cheap and most excellent furniture-polish. It must be shaken well before using, rubbed in with a woollen cloth, and polished with another. Persistent rubbing with it will efface the white marks left by hot things or wet things upon varnished wood. Where the mixture is used as a polish pure and simple, the thing

to be polished should first be well cleaned either with turpentine, naphtha, or warm soap-suds. Wood scratched deeper than the varnish should not be washed with the suds, as the water soaks into the scratches and makes an ugly permanent stain.

Mahogany, especially old mahogany, has a trick of getting filmy no matter how well cared for. To remove the film, wash it every three months with weak tepid suds, then polish with this polish, which is French, and warranted to give fine wood an incomparable lustre.

French Polish for Hard Woods: Ten parts pale rosin, eighty parts benzine, five parts palm-oil, one-half part essence verbena, one-and-one-half parts essence peppermint. Keep hermetically sealed away from fire and light. Shake well before using. Apply with a silk rag, and polish after with a dry silk cloth.

The Care of Mirrors

Remove fly-specks and dirt from mirror surfaces with whiting mixed to a cream in alcohol. To clean a gilt mirror-frame, brush off every particle of loose dust, then wet it a little space at a time with alcohol applied with a camel's-hair brush. Rub off the alcohol before it dries with clean, soft silk cloths or fine flannel. The dirt should come with it—hence change the cloth often. If there are breaks or rubbed places in an ornamental frame, fill up with plaster, wet very soft with white of egg, shape quickly, let set, then smooth over with plaster newly wet to a cream in tepid water. When the outer coat is full dry, gild either by pressing on gold-leaf or painting with gold paint. Only the finest frames are worth genuine gold-leaf. The same treatment, of course, applies to picture-frames. Pictures themselves are best cleaned by a very quick wiping over with a cloth wet in alcohol, and afterward another quick wash with weak white soap-suds.

They must be patted, not rubbed dry, with very soft towels. Nothing powerful enough, either chemically or mechanically, to attack varnish and colours ought ever to touch a canvas.

If a mirror is badly blurred, resilvering is the only genuine cure. Partial blurring may be mitigated in several ways, and scratches made almost invisible. Take out the wooden back, wipe off the silvered side quickly and carefully with a cloth wrung out of warm water. Be sure to wring it dry, and follow it with a patting from a soft hot towel.

If there are scratches, paint them over with the very best silver paint, cover, and leave to dry. Or the scratch may be backed with a square of silver, or tin-foil, with a drop of white glue at each corner to hold it in place. With blurs, mark them out so as to give a clean outline, wet the blurred silver with alcohol, and after a little scrape it off. Then either paint the clear spot or back it with foil. The foil must be something bigger—big enough to be glued to sound silvering, as the glue will show through the glass. Lacking both paint and foil, a mirror may be bettered by simply laying gray-dark cloth behind the defects. If it hangs away from the light, black cloth is better than gray.

Repairing Upholstery

Upholstery demands more knack than strength. In recovering anything, as a chair or sofa, first remove the tacks which hold the edging-gimp, then take off the plain outsides. This will reveal the tacking. Cut the tacking threads, remove the buttons, noting how they are applied. Loose all the edge tacks, take off the old cover, mark the middle of it, brush it well, and press very smooth. Go over the chair with a whisk-broom and a small brush, and remove every particle of dust and lint from the tufting.

Spread out the new covering flat and smooth, doubling it lengthwise, right sides together. Fold the old cover likewise, and lay it on as a pattern, taking care to make the threads run the same in old and new. Cut with very sharp shears, and sew up wherever seams are needed. Follow the original cover in finishing. That is to say, either bind the bottom and leave it free, or sew it to the seat-cover and bind the seam. Next, put the middle of the new cover to the marked middle of the frame, tack it lightly with temporary tacks along sides and arms; then begin tufting straight down the middle, taking great pains not to pull the new cover awry.

The tufting requires upholsterers' needles and twine, to be had at any shop. Thread a needle with three yards of twine, double, and knot it; then stick it from the back through the highest middle tuft, press the cover in with the fingers, arranging it in proper folds, pass the needle back, draw it tight, then bring it out again, thread a button upon it, and again pass it to the back. Fasten there with a slip stitch, and go on to the next tuft. Work straight up and down, taking care not to draw the new cover so it will not reach. When the tufting is finished, lay the edge in proper pleats, tack down, and cover with new gimp. Finish the back first with a cover of paper muslin, and over that a smooth stretch of the furniture stuff. It is wise to practise upon something one can afford to spoil, as upholstery is among the rare things easier done than said.

Cleaning Pillows, Mattresses, and Feather-Beds

To clean pillows, whether of down or feathers, empty the stuffing into a bag of cheese-cloth or mosquito-netting, tie the mouth of it tight, and wash in a big tub of strong white soap-suds, touched up with ammonia. Rub

the bag between the hands, and souse up and down for ten minutes. Rinse in clear hot water twice; do not squeeze, but hang to drain and dry—in the sun, or near the heat. When half dry pull the bag apart several times. When full dry, drop it inside a thicker bag, and whip vigorously with a rattan whip for ten minutes. The feathers will be like new. There is a slight loss, of course. Half a dozen pillows will come through the wash about five. Because of the loss, do not wash either feathers or hair in set tubs—the fluff going into the pipes makes no end of trouble.

Feather-beds or hair-mattresses can be washed the same way. Either is an undertaking, but one worth while. Pick up the hair from the mattress before it is wet. Let it dry thoroughly before making up anew. To do that cut a mattress-tick, sew the bottom and both sides well together, bind the seams, and sew on a cover across the top. Spread a sheet on the floor, stretch the new tick upon it, and set a chair at each corner, to which the sides may be attached. Thus they stay upright, while the hair goes in. Pack it evenly all over, then draw down the cover, and pin it smoothly to the sides and across the bottom. Begin at one side and tack, using a mattress needle and soft but strong twine—rough twine cuts and pulls. Go up and down twice, and finish by tying. Mattress buttons are ornamental, but a round of thick flannel answers every purpose.

Feathers in a clean tick freshen wonderfully for getting wet with summer rain, and then sunning a week. It is much better than the steam-scouring, though the scouring is better than no cleaning. Down comforts may be wet with clean water, and hung in the hot sun with manifest betterment. Cotton out of comforts may be washed like feathers, only it needs no bag. When dry, pick or card it afresh, or sun well, and whip hard.

The Soldering-Iron

Leaks, unless they happen to be in the water-back itself, may be held in check with the soldering-iron until the plumber comes. If small, they may be mended outright. They have so much a habit of developing at the most inconvenient times, it is wise to practise with the iron until reasonably expert. For a hot-water leak, draw the fire, cut off the water, and empty the boiler by opening the lower plug. Hammer the leak gently so as to press the rent edges together. Make a little dam round about it with wet flour or plaster, sprinkle in powdered rosin, hold the stick of solder hard against the break, and apply the white-hot iron until the solder runs. As soon as the solder cools, turn on the water and test the mend.

As to Drawers

A drawer that works hard—either binds in some place or is not built true. For the binding, the plane is the remedy. Take off two or three good shavings wherever there is sign of friction. To test the build, press across the back-corners diagonally—if they give, square them, and put in screws to keep them so. Closet-drawers built in a house or apartment are nearly sure to need the screws. Steam-heat plays hob to such an extent with glue, unseasoned wood, and poor carpentry, it is always well in reconstructions to strengthen everything with screws or brads.

Mending Furniture

Though liquid glue is so cheap, a glue-pot pays. Melt only as much as required—remelting takes away strength. Break the dry glue into the pot, cover it with cold water, half fill the water-bath around it, and add salt to raise

the boiling-point of the bath. Boil until the glue is clear and ropy. Thin for use with strong vinegar or alcohol. For fine work melt white glue in china—say a cup set in a saucepan—and thin after melting with twice its own bulk of gin.

To mend wood well, scrape away every trace of the old glue, and wash the join clean. Wipe it dry. Cover both pieces well with the hot glue, press them firmly together, and tie fast. But do not depend wholly on the glue. Turn the mended article upside down, and drive short brads diagonally from both sides. They must be short enough not to reach the surface. Sometimes a screw is better than brads. First make a fine gimlet-hole, so deep the screw-head can be countersunk. Put in the screw, force it in a quarter-inch under the surface, fill the hole with putty, and stain or varnish. But that comes after the drying. Leave the glue a week in a moderate temperature to harden, then scrape off the surplus glue, sandpaper the join, and polish with oil and alcohol.

Chapter *THREE*

Concerning Closets

THE ideal closet is like the dictionary, the place where a thing can be looked for with the certainty of finding it. To make and keep it so requires both knowledge and wisdom. The knowledge alone can be put into print. Wisdom, like so many other good things, comes by nature. That is but a brief way of saying that housewives, like poets, must be born, and get a deal of making afterward. Notwithstanding, much *may* be *done* in the face of natural lacks. The bumps of order and contrivance are wonderfully susceptible to proper stimulation.

Kitchen-Closets

Their construction has been sufficiently dealt with. (See Chapter Kitchen Convenience.) As to their use and keeping much remains to be said. The saying is in large measure a succession of Don'ts. For example: Don't put pots and pans behind closet-doors until they are thoroughly and scrupulously clean. If cleaning them must wait for a more convenient season, leave them in the open—upon the hearth, in the sink, or on the kitchen-table. Turning a greasy or sticky vessel upside down upon a closet-shelf is offering a premium for ancient and fish-like smells. Indeed shelves upon which even clean vessels are to be kept inverted ought to be full of auger-holes—full enough to prevent even a suspicion of musty

air. But make all other orifices, as cracks at the back, or where the wall joins, or around the corner posts, water-tight, and water-bug-tight, with putty plentifully laid on, or with plaster and white of egg. Putty is best because it can be washed with impunity. For the same reason painting with pure white-lead is the very best interior closet finish. White-lead is, however, expensive. Its place can be well taken by the quick-lime whitewash. (See Chapter on Repairs.) The whitewash will bear quick and careful washing. Moreover, it can be renewed quarterly at a slight expense in money and trouble. Paint or whitewash walls, joints, the under sides of shelves—everything except the shelf-surfaces. Leave them untouched. Don't cover them. Wash them weekly with soda-water and a little soap, and monthly, scour well.

Strips of wood screwed to the closet-back and filled with nails and screw-hooks for hanging up things hangible nearly double closet space. Fit the strips so neatly no creeper can harbour behind them. If they warp, fill the warpings with putty. Ironmongery is nearly always heavy, hence best kept to itself on a low, handy shelf. It is a mistake to put it too low—stooping is tiresome enough without lifting a weight in rising.

Don't put away cooked food in a kitchen-closet. It will taint the air, and itself in turn be tainted, though ever so faintly. Smells have for long been held to come from faint volatile particles, escaping from odorous substances and diffused in the air. The newest smell-explanation is that, like light, smells come through the perception of special vibrations. The persistence of food-odours certainly lends a colour of reason to the new theory. It is this persistence which makes various economies unthrifty. For example, by saving a cent's worth of left-over turnips, cabbage, or such matter, one may develop at least $5.00 worth of bad smell in a closet.

Closets located above set-tubs ought to be set apart for earthenware. The rising steam will rust and corrode iron, tin, copper, and brass. If general use of a closet so placed is imperative, upon wash-day mornings put a lump of quicklime, as big as the two fists, in a platter upon every shelf, and close the doors tight. The thirsty lime will drink up the moisture and keep the closet dry and sweet. The same precaution is wise in muggy weather, especially if it is hot as well. Indeed, throughout the dog-days a cheese-cloth bag of quicklime suspended in every kitchen-closet will do much to make the kitchen-atmosphere entirely wholesome.

In closet-scouring a flood of water is by no means essential. Take out everything, then, beginning at the top, with a soft, dry cloth, wipe away every trace of dust and all loose particles. Rub all the grease-spots well with either a good scouring soap or a jelly made by dissolving laundry soap in a little water and adding a cupful of very strong soda-water. This jelly ought to be kept on hand in a low, wide-mouthed glass jar. Use squares of coarse crash, or even burlaps, for scouring cloths—closely woven stuffs do not take up dirt half so well. Wring a cloth out of very hot water, and go over the whole shelf. Leave it wet, but not sloppy, when a soaped spot has to be dealt with. Wash the soaped spots last, then with clean, hot water go again over all the shelf-surface, rubbing hard, and leaving it as dry as possible. The whitened walls should be wiped over with the cloth wrung out of soap-suds. Zinc-paints are bad in closets, because they bear scouring so ill. White-lead with reasonable care ought to last ten years.

Don't set sticky dishes or bowls or platters upon a closet-shelf. That is one way to draw all the host of crawl-y things which so infest slovenly kitchens. Apartment kitchens often suffer such visitations in spite of the utmost vigilance in their keepers. Roaches and water-

bugs are rank expansionists, and delight from the vantage-ground of one ill-kept kitchen to overrun and possess half a dozen clean ones. Putty well applied does much to foil them. If any slip past the blockade kill them with powdered borax. Mix it with its own bulk of powdered sugar, and strew it liberally wherever the insects congregate. Benzine is also useful in such warfare. Use it only in summer and when it is broad daylight. Open all the windows wide, put the benzine in something with a long slender spout, and go over, under, through, above, below, between, beneath, everything that can hide a bug. Keep the liquid running a fine steady stream—thus only will no guilty crawler escape. Close doors but leave windows wide, and let the room stand untouched for twelve hours, or twenty-four if possible. Beware of striking a match or carrying a light in it until the benzine fumes have been dissipated.

Pantries and Store-Rooms

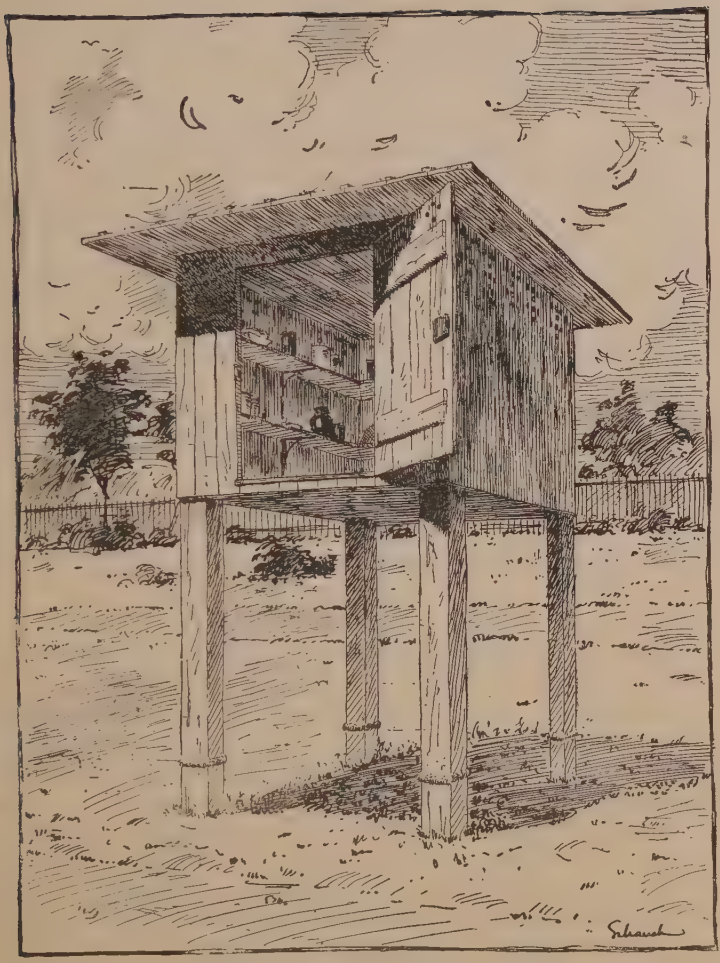
Pantry requirements are a trifle paradoxical, in that they are air and light, and also air and darkness. A pantry window is essential, even if it be no more than a tiny two-light sliding sash set anyhow in the outer wall. A regular window is much better. It need not waste wall-space—shelves can be so placed across it as to admit its working. But if a pantry can be allotted as much as six feet of house-wall, it is better to have the window set crosswise, with the lower edge a little more than breast-high. Then, by making one sash of glass, and filling the other with wire-gauze, the pantry can have a fresh-air closet. Have a tight deal partition running out from the sash division as far as space permits. Put shelves around three sides of the two compartments thus formed, and close them with tight light deal doors. Thus the pantry can subserve its proper purposes, and the fresh-air closet

banish the iceman for six months in the year. Throughout the other six it is no less useful. All manner of food keeps beautifully in it, from one meal to the next. Further, things may be put in it while still warm. If they have to go into a tight, unventilated place as a refrigerator, they needs must be stone-cold, or they will get soggy and smelly.

Always set away cooked things in dishes with ventilated covers. Wire-gauze dish-covers are excellent, but too costly for many purses. A good substitute is a hoop or oval of stout wire, with either cheese-cloth or mosquito-net sewed firmly over it. Make the hoops of sizes to fit all sorts of dishes, or, rather, of sizes to stand an inch beyond the edges they must cover. The weight of the wire holds them well down. Every week drop the covers in a wash-boiler with water and a little soda, boil for five minutes, and dry in the sun.

Light and lime, the best of all antiseptics, should be relied on to keep the fresh-air closet sweet. Hang a bag of quicklime somewhere, and change the contents as fast as the lime slacks. In country or suburban houses ants are often a plague. A ring of air-slacked lime, an inch wide and half an inch deep, will keep them out of a dish holding food. They cannot crawl over a shelf thickly dusted with powdered lime. But, since they travel always by definite roads, it is well to find the path, and block it by a smear of coal or pine-tar, applied, if possible, outside the pantry.

Save in freezing weather, keep fruits, vegetables, and cut flowers in the fresh-air closet until wanted. Cooked meats and salt ones can stay there the year round, and fresh meats in cold weather. It is, further, the place for such things as cheese, nuts, raisins, dates, and olives. All of these lose flavour or grow rank by keeping in a warm place, or by suffering great alternations of temperature.



OUTDOOR FRESH-AIR CLOSET

People with plenty of ground-space, yet constricted houses, may profitably take a leaf from the book of South-country household economy. It is common there for country-folk to have a sort of outdoor fresh-air closet, a small detached structure set in the shadiest place possible, standing upon four tall legs, with a flat shingle-roof of barely enough pitch to shed rain. The floor is at least four feet from the ground, and the whole structure only big enough to reach well across. There are shelves all round, and the weather-boarding up next the roof is full of tiny auger-holes. The door fits tight, and fastens with a lock. Around each of the four legs there is commonly a tar-bandage applied six inches above the ground. This traps venturesome ants, spiders, and the like, thus keeping the inside clear. The structure is whitewashed inside and out twice a year. In hot weather floor and shelves are washed every morning, and scoured twice a week. Such a fixture should not cost over three dollars even if one hires it built; and it is certainly among the handiest things one can have about the house or yard.

How and When to Keep Things

Preserves, jellies, pickles, catsups, etc., keep best on the floor. Set them in orderly rows beneath the lowest shelf. The cool, equable temperature there is just right for them. In front of them hang a thick curtain. Standing in the light makes them insipid and pulpy. Contrariwise, all manner of things put up in sugar are improved in colour and flavour by sunning for several days just after they go in glass. Jelly that will not " jell " is sometimes reformed by sunlight into beautiful solidity. Sunned preserves, especially if there is a brandy paper on top of them, almost never mould, no matter how long they may be kept. Any sort of pickles or preserves will run out in spite of hermetic sealing if the cans are set

where it is alternately very hot and very cold. Tins ought to be impervious to light. Possibly they are, but there must be a sort of X-ray in common daylight, since tin cans suffer almost as much from standing in the light as do glass jars.

Wine in bottles should also be kept on low pantry-shelves. A cellar is better, but often out of the question. Provide either wire bottle-racks, or else have holes cut in the shelving so the bottles can be laid on the side, with the corks a little lower than the tipped hollow ends. Once a month raise each bottle, cork downward, and shake it very gently. Thus any sediment is detached from the side, and gathers in the neck. In drawing a cork, hold the bottle sidewise. By pouring out possibly a tablespoonful of wine before decanting, the whole bottle is freed of dregs.

Vinegar likewise needs to be kept from light after it comes to full strength. While still fermenting, light is a help. It is unsafe to keep either wine, spirits, or vinegar in wood within a pantry. No amount of paint will wholly stop the ravages of the wood-worm, and, once a stave is bored through, the pantry may be flooded in a night. Wickered demijohns of handy size are best for all such liquids. Stone jugs come next. In a pantry that cannot be heated, stoneware is better than glass for vinegar and light wine. Both freeze in zero weather, and stone does not break so easily as glass.

Nothing in brine, neither animal nor vegetable, ought to be kept in a pantry. Better set a pork or beef or pickle barrel wholly outside than risk tainting all the other things one must eat. If hams and smoked beef are hung in it, they ought to be canvassed, then dipped in thick paste, and rolled in flour mixed with ground black pepper before putting up. This keeps away insects, and prevents smells. Put smoked sausage in the stoutest paper-bags, and seal the mouths before tying up. Salt

fish either wet or dry will smell aloud in spite of all precautions. It almost demands to be kept wholly apart.

Whiten and keep white the whole pantry interior. Then moth, rust, mould, also any sort of creeping thing, is plain to a casual glance. As to cleaning, prevention is better than cure. Do not splash or strew things about, nor push them helter-skelter awry, no matter what the haste. A weekly dusting, a monthly sweeping, ought to keep the place clean if they are supplemented with thorough cleanings twice each year. Spring and fall move out everything, look the floor over for cracks, mice-runs, and rat-holes; stop them if found, go over shelving and hooks, make everything tight and trig, then rewhiten—the quicklime whitewash is here the best thing. (See Chapter on Repairs.) Make everything smell fresh and soapy and limey, and let the scoured floor and shelves have a half-day to dry.

Moist sugar, barrelled, is almost sure to drip—hence there is economy in buying granulated or cut loaf. A drippy barrel makes no end of dirt. There are several ways of minimising the trouble. One is to set the barrel upon a low slightly slanted platform, and keep a shallow pan under the drip. Another is to set the barrel in the middle of a big double sheet of the thickest, toughest paper, and tie the paper loosely up around it, about the second hoop. The paper catches the drip, and holds it safe if care is taken not to break it. Otherwise it is better left off.

Storing Clothes, Furs, Blankets, Etc.

Where a store-room can be included in the building plan of a house, put it as near the roof as possible, and, further, skylight it. Thus all the wall-space is free for shelves and hooks. Thus, too, the room gets more sun-

light. Set the shelves along two sides, with the lowest one high enough for a packing-trunk to slip well beneath it. If possible have sliding shelves to draw out from under the stationary ones. They should be in yard-long sections. By their help a shelf-section's contents may be examined, turned over, brushed, and replaced without moving from one spot. Where many heavy trunks are kept, it pays to have staunch hardwood rails on the floor below the shelves. The trunk-castors run on the rails without dragging or hard tugging. Cedar or camphor wood shelves and panels are put into the store-rooms of the finest modern houses. The mass of us, however, must put up with clear pine or deal. Have it painted white, and very well varnished. Dust well spring and fall, then go over the varnish with a woollen cloth wet in kerosene, rubbing lightly and quickly, but leaving no spot untouched. This will make the wood as uninviting to the moth-miller as even sandal-wood. Sachets of cotton-batting, rolled in sandal-wood sawdust and laid between thin silk, may line to advantage the shelves devoted to fine woollens. Such things as Cashmere shawls should be well sunned at least two days, brushed over three times with a thick soft brush, then shaken hard, and folded lengthwise with a layer of clean newspaper between the folds. Next roll them up smoothly into a hard round roll, sew on a tight cover of clean old linen, then slip inside a paper-bag and paste up the mouth. If no moth-eggs are inside at the rolling up, none will be there at the unrolling, though it may be five years later. Neither tobacco, camphor, nor the evil-smelling so-called camphor-tar, will kill hatching moths. The utmost they can do is to warn away the miller-mother.

Camphor alone is dependable for even that service. Get the gum, and break it into little lumps. Sometimes spraying with camphor dissolved in alcohol acts as a preventive. It must be, however, applied only to shelves

or outer coverings, as it dries into white crusty specks disfiguring to fine fabrics.

Sun and brush blankets well. Put little cheese-cloth bags of camphor into the middle of the roll, and sew each pair up tight in old linen. Pack them down in the blanket-chest, which should occupy one side of the store-room. If it is built in the wall, so much the better. There can be broad shallow drawers all along the bottom. Failing that, a movable chest, cedar if possible, should be provided. Even a big wooden drygoods-box is better than no chest. Stop the cracks well with putty, paper the outside, and paint the inside white. Have the lid hinged on, and close with a spring-bolt outside. A strip nailed around the cover, so as to stand half an inch lower than the edge, helps to keep the contents safe. If perfectly sure as to the condition of things packed inside, it pays to seal the edge of the box with a strip of tough paper pasted on, and leave it unbroken until the things are needed.

Quilts and comforts keep best hung over poles. Fasten wooden curtain-poles stoutly so as to stand a foot from the wall. Space permitting, have them of full comfort length. Several may be set between ceiling and floor, the lowest coming a little less than waist-high. Spread quilts and comforts evenly across the poles, one on another, and cover the mass with a sheet of unbleached muslin reaching well below the lowest edges. Reserve the uppermost pole for hangings, especially if there are any of plush or velvet. Sun, whip, and brush them well, baste the edges together, pile in, then baste the doubled edges strongly together, and hang so the seam lies flat along the pole. If other hangings are to occupy it, put the velvet ones on top. Brocade may have much the same treatment. Doubling the right side in prevents fading, and if hung smoothly but lightly full length on the pole, there is no perceptible crease. On top

of all put a muslin cover big enough to shroud everything.

Caring for Rugs and Carpets

Before putting away rugs, spray them with strong black-pepper tea, using a very fine atomiser. Sun well after the spraying, but beat well before it. Beat again, using a strong rattan, brush hard on both sides, then spread smooth, and paste together a sheet of newspapers a little bigger than the rug. Get a round wooden roller two inches through, and as long as the rug is broad. Lay the paper on the right side of the rug, then put the roller at one end and roll up rug and paper, keeping the rolling true throughout. Next roll up spirally in a long strip of soft old cloth, wisp down the ends, and tie fast, then cover with tough manilla paper, paste down the straight edge of it, slip a stout paper-bag over each end of the roll, and paste the bags firmly in place. As long as they are unbroken no moth will get in. This is, of course, only for valuable rugs. Ordinary ones may be beaten, sunned, brushed, sprayed with the pepper tea, and rolled up with a sprinkle of gum-camphor between the folds. Cover the rolls with burlap or manilla paper. If there are already moth-eaten places, and presumably moth-eggs, before rolling up cover the moth-eaten spots with a wet towel and iron with a blazing-hot iron. The steam will make an end of moths, actual or potential.

Carpets, even carpet-lengths, ought to be thoroughly cleaned before going in the store-room. Fold them smoothly and compactly, with a liberal allowance of camphor, and wrap in big muslin sheets. Keep them well toward the middle of the store-room, where light and air are unobstructed. The skylight should be raised every bright day in summer. If sun-fading is feared, fit a light

frame just below the skylight, and tack cheese-cloth over it to temper the rays.

Pack away fine winter garments, silks, cloths, and velvet, in roomy trunks, shallow rather than deep, or with shallow trays. Brush away all dust, untack folds and loopings. With a velvet skirt it pays to take out all the waist-pleats. Fold as smooth as possible, but put a roll of cotton-batting inside tissue-paper at every fold, so there may be no crease. Stuff sleeves likewise full of tissue-paper, crumpled. Lay waists and coats shapely, with crumpled paper inside. Cover the trunk or tray with a soft white cloth before laying in the garment. When the folding is over, draw the white sheet smoothly across every part, and tuck in the ends so as not to crush or crumple. On top of the white spread lay bags of gum-camphor and wisps of cedar-shavings. The trunk may have further the sandal-wood sachets. But in moth-fighting it cannot be too often repeated prevention is the only effectual way.

Particularly with furs. Sun and comb them at least a week, then go over them three times with a stiff thick brush, parting the hair at all creases or folds, and brushing the pelt underneath. Small things, as muffs, tippets, and collars, as well as small capes, can be wrapped in clean newspaper—the ink is a moth-preventive—then wrapped again in old linen, sewed snug, and popped inside a paper-bag; then the bag-mouth pasted, and, after drying, the whole laid in its proper box. Fur garments ought to be hung upon coat-hangers, first sunning and brushing them well. Fasten the fronts, then cover them with several thicknesses of newspaper. Let the paper go lower than the bottom, and double and pin up the surplus length. Next slip a mothaline bag of generous size over the garment, pass the hanger-hook up through the hole in the top of the bag, and tie the bag very tight around the hook-shank. Pin up the extra bag-length all along the

bottom, folding it over at least three times. Hang the bagged garment where nothing else will touch it. Thus it is saved from both creasing and moths.

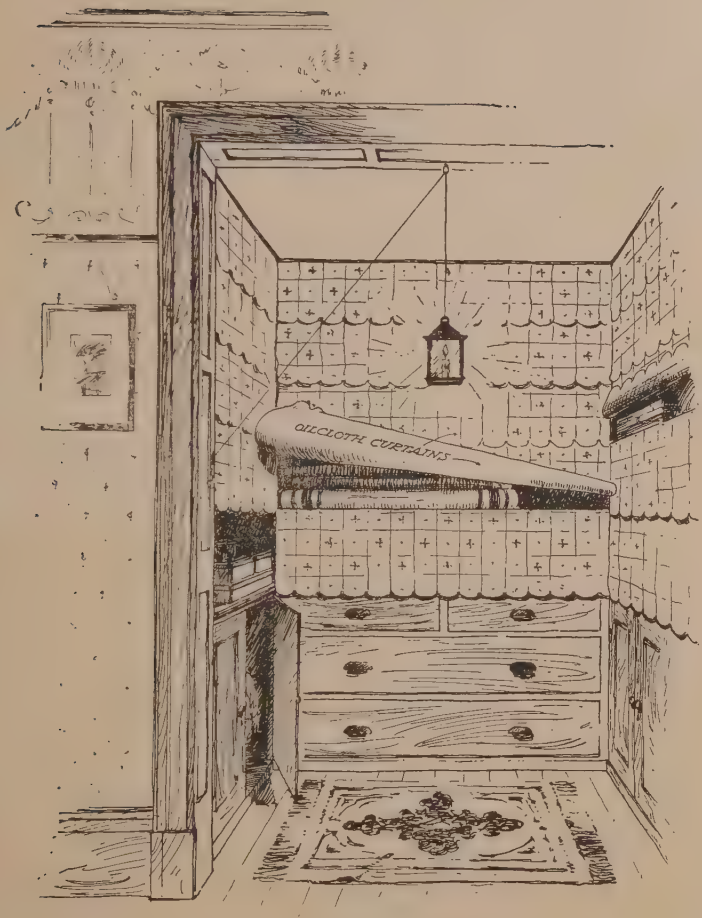
Storing summer things is simple. All that is needed is to have them free of starch, dust, and grime, to fold them neatly, and cover them from the light. Frivolous summer frocks can go in the boxes. Other things are much better laid upon the shelves. Where there are many children it is a good plan to put each little one's garments together upon a shelf, with the name marked plain on top of them. It is the same with summer room-fittings. Put them together, and mark as "The Blue Room," or "The Red Parlor." Denim, which washes badly, may be stored after a good brushing, and be serviceable next season. But chintz, muslin, and net hangings are best put away rough dry.

The Linen-Closet

A word in the beginning. Linen ought to be for use, not for show. Better the simplest cloths fresh from the laundry, even if something frayed, than the richest damask yellow with long lying. Indeed, it ought to be a cardinal rule in every home that the silver, linen, and fine manners are to be used every day. Use brightens and whitens all three, and does not wear them anything like so much as lying in wait for company.

Use, which is thus essential, should be also equal. To insure that, have a drawer apart from the main linen-closet. In it store a two-weeks' supply of every linen requisite. When all its contents have had their turn, take them back to the main closet and bring others in their stead.

Since a linen-closet may be nothing more than a cuddy, or a stately apartment all over shelves and tables, it is worse than idle to dogmatise regarding its arrangement.



THE LINEN-CLOSET

But in a general way one principle runs through great and small. It is orderly and systematic placing. In the linen-room of the world's finest hotel there is a specially marked shelf-space for the linen belonging to each of the seven-hundred-odd rooms. Linen is not a conventional term there. Sheets, pillow-cases, cushion-slips, are of real linen, Irish or German, grass-bleached, hand-sewed, and embroidered with the hotel initial within a wreath of oak-leaves. Further, in the table-linen section each day of the week has a shelf. Monday's cloths and napkins go out only upon Mondays. Tuesdays it is the same. Even in times of great stress the rule keeps intact. The proprietor had rather buy extra things than to set the system of giving out and checking the main supply awry.

This linen-room keeps books with itself. Every room is charged with the things issued to it. The chambermaids and laundrymen are responsible for its safe return. The laundry, which is up in the airy tip-top, beautifully lighted and ventilated, can wash, iron, and return five-thousand-odd pieces within an hour, and that without strain. Steam, steel, and electricity do the work, plentifully supplemented by human skill and muscle. The big steam mangle-rollers are ten feet long and four feet across. Six girls stand either side of them, to spread the damp linen in place and take it off as it comes up smooth, dry, and shining.

No housewife, even the richest, can command all that. It has been mentioned merely by way of exemplifying the value of system. What the hotel does in large the housemother may do in little, by dividing her shelves and marking the spaces appropriately, as: "Huck Towels," "Hemstitched Towels," "Damask Towels for Blue Chamber," "Towels and Sheets for Back Room," or "Nursery Sheets and Towels." Tie each week's wear with a separate-coloured ribbon, and beside the marking put matching ribbons, numbered one, two, three, four.

With the blue ribbon empty, there cannot be a question as to which colour's turn is next.

With a sufficient towel supply, divide the towel-shelf and mark the divisions with the days of the week. Thus use can be regular. To insure that with napkins, always take out fresh ones from the bottom of the pile, or else put the clean ones underneath as they come from the wash. Keep shelves and drawers as nearly as possible free from dust. A good way to do it is to curtain them with thin white oil-cloth, daintily scalloped along the bottom, and deep enough to reach from shelf to shelf. Tack the upper part to the shelf-edge, and along the bottom sew stout hooks, eight or ten inches apart. Opposite every hook, in the shelf above and below, put in a tiny brass screw-eye. Hook down the curtains after the shelves are filled, and hook them up out of the way in taking down or putting up linen.

To light a closet of any kind, but more especially a linen-closet, the safest thing next after electricity is a light clear glass lantern, with wire-guards outside the glass. Swing it by a light chain-pulley some little way in front of the shelves. Thus a touch sends it up or down, throwing the light wherever it may be needed.

The fine invisible dust which oozes into every space not hermetically sealed will get into a linen-closet in spite of all precautions. Therefore wipe off the shelves of it once a month, with a clean cloth dipped in boiling water, and wrung very dry. As to finish, the shelves may be merely sandpapered and varnished, but are better painted white. In damp weather open the linen-closet an hour each day. Rose-leaf sachets give the linen an exquisitely delicate fragrance. Gather freshly opened petals, dry them in the shade, and when thoroughly dry mix with half their own bulk of dry lemon-peel and calamus-root —both grated. Strew the mixture thickly over sheets of wadding, and tack the wadding between either cheese-

cloth or china-silk. Fasten the sachets to the closet-walls or lay them along the shelves. Now and again give them an hour's sunning. It freshens them wonderfully, and brings out the odour anew.

Housemaid's and Lamp Closet

A housemaid's closet is most conveniently located either in the back hall or just off the kitchen-door. The best shape for it is the corner-cupboard, with the lowest shelf about table-height. There should be shelves above—for dust-cloths, dust-pan and brush, whisk-brooms, polishing-cloths, polishes, wax, scrubbing-block, scrubbing-brushes, indeed, the whole paraphernalia of housekeeping. Upon the door there should be hooks near the top, from which brooms can be hung. Underneath the shelf keep two fibre-pails, one big, one little. They can sit one in the other, with mops and floor-cloths on top of them. This will leave space in even a shallow cupboard for a demijohn or glass oil-can. A pair of very sharp smallish shears ought to hang beside the lower shelf for trimming wicks when lamps are filled. They ought to be filled on the shelf, which may be some inches wider than those above it. Only the lamps proper should be brought there. Chimneys, shades, and ornamental bases must be left elsewhere. Set the lamp to be filled in a clean shallow pan; then, if the oil runs over, it neither messes the shelf nor is wasted.

Clothes-Closets

There is sex in clothes-closets. A man's is distinctively unlike a woman's. It needs not only hooks in plenty, but a stout pole some way from the back, over which trousers may be so laid as to preserve and heighten the cherished fresh creases. It needs, further, side-

shelves for waistcoats, extra depth for cross-hanging of coats on coat-trees, wide shallow shirt-drawers, and specially contrived spaces for hat-boxes, to say nothing of boot and shoe room and a small drawer for handkerchiefs and ties.

Given all these, a man with neat impulses may keep himself in a fair estate of clothes. Since his closet is likely to be crowded full, the wall-finish must not rub off. This makes the white-lead finish, well varnished, imperative; also the puttying of all cracks big enough for moth or dust to lurk in. After all that is done the closet should have a weekly dusting, along with all its contents, and, twice a year, a going over with a very soft paint-brush dipped in turpentine mixed with its own bulk of kerosene. This for moth-prevention. Be careful to leave the closet empty until the softened varnish has had time to harden. Work quickly with the brush so as not to streak the varnish, nor leave the paint in ridges behind it.

This is the treatment for a clean clothes-closet, regardless of sex. A woman's closet, however, needs ever so much more elaborate appliances to properly accommodate her finery, and at the very least four times as much space. At one side it should have broad shallow drawers, coming almost waist-high, and long enough to hold a skirt without folding. Above them there should be a shelved press closed by doors, and divided into square or oblong compartments. These are for hats, bonnets, and waists too frail to bear their own weight. One end ought to be cut up into tiny cabinets, each just big enough to hold a pair of shoes, stuffed lightly with tissue-paper.

Such a closet takes up about one side of a dressing-room. Over against it there is a press full of drawers and shelves for all manner of dainty underwear. Very elaborate tea-gowns and extra-crushable skirts are swung to the ceiling upon easily lowered pulleys working over hooks. Thus it appears that the proper housing of my

lady's fine wear is no light matter. Meditating upon it, one wonders how on earth Queen Bess kept her three thousand gowns—if she carried them about with her on royal progresses or left them scattered through her palaces—only less numerous than her lovers.

In closets of this sort almost every fine frock has its own special winding-sheet of muslin, soft and fine. For hanging skirts the winding-sheet, or, rather, bag is bell-shaped, so as to cling without crushing. Since all these things are for the favoured few, pass we to accommodations befitting the mass. Even in the simplest sort of closet, one that is no more than a curtain swung from a broad board overhead, the careful methods of fine folk are very well worth while. Any skirt wears better if it is hung so as not to drag. The plainest bodice is worth a wire-hanger. Old sheets may save the one best gown fresh and dainty throughout a season's wear. And, instead of the cabinet-presses, one may set hats and bonnets in wooden boxes, neatly papered, and piled one on another at one end of the curtained space. Wrap each hat in a sheet of tissue-paper as it is put away. Take care that the paper does not crush plumes and nodding flowers. If there is trimming beneath the brim, put into each hat-box a pasteboard bent to the shape of a big thimble, and high enough for the small end to hold the crown of a hat well above the box-floor.

Never put away a muddy skirt, nor one very dusty. Thus the closet stays clean with a minimum of work. Whatever its shape or size or way of having its being, the white interior is best, and the filling up of crannies pays. Coloured curtains ought to have a white lining. If they run on rods, all the better. Draw them away from the front for an hour or so upon sunny mornings. Open doors likewise. Every sort of fabric and garment lasts and looks better for plentiful airing.

China-Closets

The china-closet is an every-day problem whose need of solution is often painfully acute. As with other problems, it is much simplified by the elimination of certain factors. Kitchen-ware, for example, ought to keep within kitchen bounds. Strictly ornamental things—"articles of bigotry and virtue"—in silver, silver-gilt, and cut-glass ought likewise to be confined to the buffet. Further, plate of every sort has no standing in the china-closet. Keep it in the original cases within a special drawer, or, better, a small safe, if it is massive enough to be worth much money.

Small silver in daily use is well kept in separate boxes in a buffet-drawer. Count spoons, forks, ladles, and coffee-spoons after each washing. Each and several they are so elusive, eternal vigilance is the price of full sets.

Thus reduced to its lowest terms the china-closet holds only china, glass, and heavier clay-wares. In at least half the houses it is built into the wall. This disposes of location. Home-makers have to accept the goods and the ills the landlords provide. Where choice is possible, let the china-closet be convenient to the sink. With a big pantry, set betwixt kitchen and dining-room, the china-closet is handiest inside the pantry. But, wherever located, it is imperative to have good shelves and plenty of them. Very many built-in closets have shelves much too far apart. A little money will remedy that. But it sometimes possible to make the high shelves answer by putting screw-hooks all over the under sides, and hanging there cups and mugs, little pitchers, and such small deer. Hang the saucers against the wall back of the cups by means of flat wire china-racks. There may be a double or even a treble row of the racks. In filling them study colours as much as possible. With saucers of

various sizes, put the biggest at the bottom, unless such placing ruins the closet colour-scheme.

Well arranged, and full of handsome wares, a china-closet is among the best ornaments of a dining-room. Tint the walls to match the general tone of the room, or else cover them with a very thin hard-wood veneer, accurately fitted and tacked in place with the smallest-size brads. Varnish the veneer, and keep clean by weekly wipings with a soft cloth wrung very dry out of tepid water.

Leave the shelf-surfaces plain, and cover them with linen cut to fit, and ornamented with a line of drawn work. Heavy butcher's linen is best, though the soft-toned art-linens may be effectively used. Set one shelf apart for glass, preferably the upper one. Cut the linen for it twice the shelf-width, hem it all round, then double it and lay a sheet of white wadding just the shelf-size inside it. Thus there is a light pad all over the shelf. It can be kept as fresh as the single covers, and will safeguard expensive glass. Big pieces of cut-glass, especially punch and salad bowls, may break from the jar of setting down upon a hard surface. More than that, they have been known to break from vibrations due to heavy street traffic close about the house. Jarring of any kind, indeed, may induce a fracture. The linen-pad stops all this. It is, moreover, a fit and dainty base for fine crystal. Never set anything inside a piece of cut-glass. To do so is to invite calamity. With a crowded glass-shelf, put down small pieces first, inverting them; then turn bigger pieces over them, taking care that they do not touch. But, before risking a big bowl thus upon its own margin, it is well to test it and see if it presses equally all round. The slightest inequality may mean destruction.

Pressed glass and coloured glass may be piled together with comparative impunity. But if, when the pile is jarred, any piece in it gives out a harsh rattle, it is wise

to recast it. The rattle portends breakage, since it shows that something presses unevenly. Slender-stemmed wine-glasses look pretty tied in clusters of three, the stems crossing, and suspended by bright ribbons from screw-hooks in the top. They need not hang low enough to menace other things. Claret-jugs can be likewise hung—a corner position is best for them. Salvers and other flat things may go in racks across the back. In that case the back needs a padded linen, like the shelf proper. Test hanging things by setting them swinging, so as to make certain they will not strike anything else.

Keep plates carefully sorted and piled, size and pattern together. Give big platters room upon the lowermost shelf. If it is not properly grooved, tack strips of lath along it, and cut the linen for it wide enough to go in and out. Stand the platters on edge, the biggest next the wall, graduating them toward the front. With a very high shelf-space they look prettier on end, the highest in the middle, and getting lower toward the ends. Handsome covered dishes are best set in a row in front of the flat ones. Use judgment and an eye for colour in all places. A small, clear yellow bit against a background of dull blue illumines everything around it. Almost any green so situated would be ghastly, though one particular tone of green goes beautifully with old blue.

Make the most of every good bit. That is the first china-closet commandment. The second is like unto it —it is to keep everything in its allotted space, and as clean as washing can make it. Since nothing soiled ought ever to go into a china-closet, aside from the weekly wiping, it should not need cleaning oftener than twice a year. Then wash everything in it, linens included, scrub the shelves with tepid soap-suds, rinse well, and wipe very dry; then leave the doors open for two hours, and be sure not to set anything back in it until the whole space is bone dry.

Chapter *FOUR*

House Cleaning

THE good word for house-cleaning is—make haste slowly. Better one cleaned room a day, and comfort therewith, than an epidemic of brooms, buckets, scrubbing-brushes, and step-ladders, sure to get everybody's temper on edge. Take plenty of time, but never begin before the beginning. Fretting over work to come may hinder, but cannot possibly help.

For house-cleaning a woman should wear clothes that admit of stooping, reaching, stretching, and lifting, giving as free play to all the muscles as a gymnasium dress. A thick union under-suit, no corset, a short flannel skirt sewed to a loose low-necked waist, a sweater, and overalls make up a costume in which one can climb step-ladders, scrub floors, kneel to take up carpet-tacks, lift, bend this way and that wholly unhampered. Thus garmented it is possible to do much more work than with skirts always sopping about, yet not feel so tired.

The prime necessities for house-cleaning are soap, water, and a right good will. But the cleaning will be quicker and ever so much easier if these three are supplemented with borax, washing-soda, ammonia, scouring-soap, scouring-sand, otherwise tripoli; whiting and pumice-stone, both in fine powder; alcohol, turpentine, benzine, and kerosene.

One needs, further, dust-brushes, scrubbing-brushes, a floor-brush, a whisk-broom, a couple of clean paint-

brushes—one large, one small—a big stiff broom, a soft broom, a good mop, plenty of wash-cloths, and great plenty of wash-leathers, swabs of many sorts, rubbing-flannels, a rubbing-pad, and a couple of light fibre-pails.

If there are hard-wood floors and hard-wood finishes to look after, steel-wool, otherwise fine steel shavings, which may be bought at the paint-shops, has many uses. To make the rubbing-pad, get a hard-wood block about the shape and size of a brick, except that it is deeper, have the two upper edges hollowed so it can be readily grasped, and mid-way the hollows, fasten a strip of soft leather, so as to go easily over the back of the hand. Next cover the face and sides of the pad, also the upper surface, except at the grip, with alternate thicknesses of stout flannel and wash-leather. There should be at least five layers —the first and last of them, leather. Fit each one snug, and sew it firmly, before putting on the next. Such a pad will last a lifetime, growing better all the while. It is for polishing waxed or varnished surfaces; hence, it is needless to add, must be kept secure from dust and dirt when not in use.

Cleaning Bed-Rooms

As in general house-cleaning, the bed-rooms are properly the first things to attack. In cleaning bed-rooms begin with the closets. (See Chapter on Closets.) While they are empty and airing, take down all draperies, fold quickly, and send away to be shaken—in the open air, if possible. Dust chairs and tables thoroughly, then go over them with a cloth wrung out of clean hot soda-water, following it with a flannel barely moistened with kerosene. Set them outside before attacking the bed, and cover with sheets if dust is likely to drift toward where they stand.

Empty bureau and dresser drawers, beginning with the

topmost, wipe them out with the damp cloth, and follow with a linen cloth wet in alcohol. This will leave neither odour nor dampness to prevent putting back the contents immediately. When the drawers are finished, dip the alcohol-cloth in a little powdered whiting and rub the mirror quickly, finishing by rubbing over with a dry flannel. If there are spots on wood or marble, treat as directed. (See Chapter on Restorations.) Clean the wash-stand in the same way, and, if movable, set it outside with the rest.

Wash the toilet-ware very clean, and fill commodes and slop-jars with boiling hot soda-water. Set them in the air, and leave for at least six hours. Sterilise tooth-brush holders and soap-dishes either by boiling in soda-water or by filling them with corrosive sublimate in solution (see Chapter on Disinfectants), and letting them stand an hour. If corrosive sublimate is used, the vessels must be afterward very well washed, as it is a deadly poison. It is, however, the most efficient weapon against bacterial infection and every sort of contagion.

Take off bed-linen, fold, and send to the laundry. Hang blankets and comforts to air. Beat bolster and pillows hard for a minute, then brush them all over with a clean whisk-broom. Wipe any soiled places over with a cloth wrung out of hot soda-water. Then with a clean paint-brush go over all seams and corners, barely damping them with the corrosive sublimate. It is sure death to insect-life either present or potential. Next sprinkle well with clean warm water, and lay in the sun, turning them once or twice so the rays may reach all sides.

Take off the mattress-slip, shake it well, turn it wrong side out, and look in the corners. Midnight marauders harbour there, often past finding out. If found, touch the corners with the poison solution before sending the slip to wash. Brush the mattress itself on both sides and along the edges, also under the tufts. Follow the broom with

the brush and poison, unless the mattress appears very dusty. In that case wash it all over with cold salt-water before applying the corrosive sublimate. Neither salt-water nor sublimate will leave a mark, and after them no creeping thing can live.

Wipe off the bedstead with the cloth wrung out of soda-water, then go over all the joints with the corrosive sublimate. Free the springs of dust, then deluge the ends with the poison. Since it is not volatile there is no danger in its use. It is not merely an insecticide, but a preventive of the first-class. If a room is found infested with bugs, every particle of woodwork in it, including floor and closets, ought to be washed with corrosive sublimate after a thorough scouring.

Remove pictures last of all, dusting them well, and examining carefully the backs of any hanging near the bed or couch. Clean frames and glasses with a flannel wet in alcohol. Set them in the empty closet, and lock the doors. Then dust the ceiling, picture-moulding and walls, window-blinds, cornices, and transom. Let down the upper sash while dusting, but keep the lower ones closed.

Next sprinkle the floor well with clean sawdust slightly damp. This if it is matted or carpeted—rugs must be removed before dusting the walls. Sweep up the sawdust with a stiff broom wet in hot water, and washed clean as soon as it shows much dirt. Take up the sawdust and sweep again with a softer broom, barely dampened. If the carpet is not to come up, go over it after the second sweeping with a cloth dipped in hot water and ammonia—a tablespoonful of ammonia to a quart of water. Wipe a yard or so at a time, then wash out the cloth in plain water, so as to keep the ammonia-water clean to the last. The cloth is, of course, dipped in it after washing, and wrung as dry as possible.

Next examine the walls well for loose paper, broken

places, etc. Repair whatever is found. (See Chapter on Repairs.) Wash off all woodwork, clean windows and blinds. Look after shades; if soiled, send them to wash, or the cleaner. Clean the base-board last of all. When it is dry go over it all around with the corrosive sublimate, sopping it plentifully behind bed, bureau, and wash-stand, and taking care that it runs where the base-board joins the floor. If there are pipes for steam-heat, and especially if they run up and down into other apartments, sluice the openings around them with the liquid poison. Thus one may minimise the chief plague of apartment life, which is—suffering for the bad house-keeping of one's neighbours alow and aloft.

Now half-raise the lower sash, and put down the upper ones an equal distance. Let them stand so several hours, until the room is thoroughly dry and more thoroughly aired. Dust it well before putting back anything. Hang the pictures first, while there is a clear sweep at the walls. Bring in the bed next, but be sure everything about it is bone-dry. Put up draperies, arrange the other furniture, and put down the lower sash. If possible to leave the room unoccupied over-night, let the upper ones stay open until twelve o'clock next day.

Carpets and Rugs

To take up a carpet properly first sweep and wipe it, then remove every tack, and carefully fold one-half the carpet back upon the other. Sweep the exposed under-side with a stiff broom well dampened, fold again in half, and sweep the under-side. Repeat until the whole carpet is in a handy pile, which can be lifted in taking away. It is vandalism of the worst sort to drag out either rugs or carpets. Take up the lining, one breadth at a time, beginning at one end, shaking and brushing free of dust, but very gently, and rolling up the length as it is cleaned.

Number the rolls consecutively, so there will be no uncertainty in refitting. Lay them out to air, then sprinkle the floor thickly with clean, damp sawdust, and sweep with a stiff broom. Take long, sweeping strokes and keep the broom low, so as not to raise dust. Follow the sweeping with a good washing. Do not splash water on the floor; it is sure to mar the base-board, and likely to damage the ceiling underneath. Use a soft, coarse cloth, and warm water with a handful of soda in it, and finish by wiping with a cloth wrung very dry out of clear hot water.

Steam carpet-cleaning is no mysterious process as many housewives mistakenly suppose. The carpet-cleaner is unquestionably a boon; still, all he does is to put dirty floor-coverings into a huge drum with slatted sides and open bottom, which steam revolves at a high rate, while arms inside the drum beat and whip out the dust, which a blast of air carries away. Thus it is plain steam-cleaning is only a very perfect way of carpet-beating. In a city house or apartment it is well to have recourse to it. But if one has a back-yard, or even a floor-space big enough to spread out a carpet, it can be cleaned at home even better than abroad.

With a grass-plot, stretch the carpet smoothly over it, right side down; then, with long limber rattan-switches, whip it steadily for an hour. After the whipping sweep the wrong side twice with a wet broom, and finish by going all over it with a cloth wrung out of ammonia and water. Fold one-half over upon the other after this wiping, then take a very fine, stiff, whisk-broom, and brush all of the right side visible. Now tie a double handful of either wheat-bran or sawdust loosely in the middle of a double square of cheese-cloth, dip the swab thus formed in clean ammonia-water, and rub the carpet-face hard with it until the swab is dirty. Wash in plain water, then dip again in the ammonia-water, and keep on rubbing until

all the surface is washed. Fold the carpet again, brush and wash the next quarter, then turn over and clean the last quarter. Hang to dry and air, taking pains to hang it straight. The bran-swab is an excellent thing to clean a carpet upon the floor. If the colours are dim and faded it may be worth while to use prepared ox-gall, a tablespoonful to the gallon, in the water in place of ammonia.

Brush rugs twice upon both sides, then whip on both sides, and brush again. Hang them over a line or on trestles if there is no grass-plot handy, nor a naked floor, upon which they may be spread. Do not clutch them by a corner and shake like mad. That fetches out some dirt, but not all of it, and is also apt to fetch away part of the rug-fabric. With grass and a sunny day, after brushing and beating, spread the rugs perfectly smooth, then sprinkle them lightly one at a time with tepid water through a very fine hose or atomiser, and wipe off with a soft clean cloth before the water has time to soak in. If a rug is very dirty, lay it in the sun, and shake clean hard-wood sawdust thickly over it, let it lie six hours, then sweep off with a stiff, clean broom, and finish by going over with a towel wrung out of hot water, and pinned tight over the broom.

Rugs with white or very light grounds may be cleaned by sprinkling with corn-starch mixed with one-sixth its bulk of prepared chalk. Let the starch remain several hours, and brush it out with a fine whisk-broom, then hang in the sun, and beat well before putting down. This method is recommended for fine silky rugs, as it injures neither tint nor texture, and makes a beautifully clean surface.

Window-Washing

Begin with the blinds, whether inside or outside. Brush the dust from the slats, corners, etc., with a stiff bristle-brush, following it with a damp clean cloth. If

the sashes are removable, take out a window at a time, wash, wipe, and set in place—thus mistakes are impossible. With weighted sash, provide a stout leather belt for the window-washer, with a strap either side, ending in a snap-hook. Fasten staples in the window-frames a foot above the sill. With the hooks snapped in these staples, one may sit in even a fourth-story window without any risk. It is, then, a mere matter of sliding sash up and down. Since a dollar will supply belt and staples, they may be reckoned the cheapest form of life-assurance.

Dust sash and glass very well before wetting. Wash the sash first with borax soap-suds or borax-water, and dry quickly with a soft, thick cloth. A Turkish towel is admirable—all the more so if it is worn to rags. Do not slop. On the other hand, have plenty of water in your pail. Wring the wash-cloth dry, but be sure it is clean, and do not slur spots nor fly-specks. Keep the wash-cloth off the glass as much as possible.

For the glass use any one of several excellent scouring-soaps, specially made and provided. Lacking them, make one by dissolving in a water-bath a cake of good white soap, and stirring it thick with powdered and sifted whiting, mixed with its own bulk of fine sand, and one-fifth its bulk of powdered washing-soda. Rub this to a thick lather with a clean cloth and tepid water, cover the glass with the lather, a pane at a time, remove the lather with another cloth wrung out of clean water, and dry, and polish with crumpled newspaper. The same treatment answers for mirrors. If the mirror surface is large two can work at it better than one. Cover it evenly and quickly with the lather, and let the rinsing begin before the lathering ends. Turpentine will remove putty or paint-spots from a glass surface.

Washing Paint

All the caustic alkalis deface every sort of paint. Hence in washing painted surfaces one should use borax-soap or borax in powder, reinforcing both with liquid ammonia for very dirty paint or whiting mixed to the thickness of cream with tepid water. Half-fill both the pails, one with hot water, one with tepid water, put a clean cloth in each, and provide additional dry cloths, as well as a small blunt-pointed wooden paddle for cleaning out corners.

Brush off every speck of brushable dust, then cover the painted surface, whether wall or woodwork, with the whiting cream, rubbing it well in with a coarse flannel. Wash it off before it dries with the pail of hot water, rinse with the tepid water, then rub the painted surface dry. Finish one space before beginning another, and, above everything, beware of slopping. For corners and curves fold the wash-cloth over the point of the paddle, and rub hard with it. Work with the grain of the brush, and do not rub hard enough to deface the painted surface.

Cleaning Enamel Finishes and Hard-Wood

Enamel finishes require to be well washed in clean warm water, using the merest suspicion of soap or scouring-sand upon dirty or grimy spots. Afterward they must be rubbed with flannel hard enough to make them very hot. This develops lustre in them quite as it does in hard-wood. Grained and varnished imitations of hard-wood are best cleaned with borax soap-suds, never letting water touch them, but rubbing well with cloths wrung very dry. Afterward they should be rubbed with

a flannel barely moistened with kerosene. If there is too much kerosene, it will dissolve and blur the colours.

Clean hard-wood with a flannel wet in turpentine, and rub afterward very lightly with boiled linseed-oil. Take off spots with fine sand mixed in oil. Apply it with a leather, and rub with clean leather afterward to bring back the polish. Once in two or three years hard-wood ought to be well washed in borax soap-suds, then rubbed dry, lightly oiled, and rubbed with leather polishers until the surface burns the hand.

It cannot be said too often nor too forcibly that, in every kind of cleaning, the very first thing is to brush or wipe away every particle of loose dust.

To Clean Matting

To clean matting, sweep it twice—first with a stiff broom, working along the grain of the straw, then crosswise with a soft broom dipped in warm water, and shaken very dry. Dissolve a handful of salt in a big pail of tepid water, and wash the matting quickly with it, rinsing with clean water. This brightens all sorts of coloured matting, and also saves it in a measure from fading.

Very light matting is best washed, after sweeping, with weak borax-water, or, rather, with cloths wrung out of it. Anything whatever slopped upon a matted floor makes the last estate of it much worse than the first. Dust invariably collects underneath, and, once wet, shows through in ugly dark splotches. Cover grease-spots thickly with prepared chalk wet with turpentine, let the mixture remain for two days, then brush off with a stiff brush. If the spot is very big and very greasy, put one-eighth as much washing-soda as chalk, and mix with water to the thickness of putty.

Little-used matting, as in spare chambers, or upper summer-rooms, should be swept very clean, then wiped

with a cloth wrung out of sweet milk. Do this once a year; it keeps the straw live, and to a degree pliant. If the milk-wash is used in a living-room, or on a piazza, follow it by a wiping with very hot clear water, to keep the floor from drawing flies.

Floors

Tile, mosaic, brick, and stone floors require the same treatment—washing with warm soap-suds whenever they are dirty, rinsing well, and rubbing dry with a thick clean cloth fastened over a flat mop. This is far and away better than the special dry mops sold in the stores. They are for the most part loose ends, which are shed plentifully at every stroke. For any sort of floor-cleaning one needs a handy knee-pad. It should be barely big enough to kneel on, yet thick enough to save the kneeler from cold, dampness, and sore joints. The pad is especially required in cleaning tile-work or mosaic. Indeed, to do such work habitually without it is to invite rheumatism and all its hosts.

Any sort of floor must be well swept as the first step in cleaning. Never mop a stained or painted floor, neither wet it all over at once. Begin at the side furthest from the door, wash a strip say three feet wide, lengthwise the boards and the depth of the whole room. Use borax soap-suds with a little ammonia, and have the water as hot as can be borne. Wet a floor-cloth a yard square, wring it lightly, double it, spread it smooth in the farthest corner, then catch it in both hands, and, keeping it flat on the floor, go backward the length of the room. If the floor is very dirty, wash out the cloth and go over the strip again. Next take a clean cloth, wring it hard out of clear hot water, and draw it the same way all over the washed strip. Then, with a third cloth, clean and dry, wipe the strip, beginning in the corner and working

backward. If the work is properly done there will not be a mark or track upon the clean surface. Repeat until the whole floor is clean. By ending at the door, there is nowhere a blur.

Both stain and paint look and last better if rubbed when fully dry with a flannel barely moistened in kerosene. A stained floor can be oiled the same as hard-wood, but must be left untrodden for twenty-four hours afterward. Care must also be taken not to leave streaks of free oil anywhere on top; they draw out enough of the stain to make ugly marks. Full oiling is unnecessary oftener than once in three years. If a stained floor is to be waxed, wipe it free of dust, soften the floor-wax in a bath of hot water, dip a flannel cloth in it, and rub very quickly all over. Spots and stains must be cleaned before beginning. (See Chapter on Restorations.) But a few spots do not make it necessary to rewax the whole floor. Simply wax over the cleaned place, and rub hard enough at the edges to blend the new wax with the general surface.

Bare boards—either pine, poplar, white-wood, or any of the hard-woods—can be brought to a very handsome finish with nothing beyond time and care. Wet them sparingly—water swells them and loosens the seams. A quarterly wiping and rinsing is enough. In between sweep thrice a week, using a soft, clean broom or bristle-brush, and mop after with a bit of Turkish towel pinned snugly over a stiff, stubby broom. A regular floor-brush, such as is a necessity with hard-wood floors, will answer even better than the towel. Such a brush is broad, flat, made of the very best bristles, with a weighted top, and a handle set at a very decided angle. It needs to be kept very clean of dust, hence should be wrapped in a clean cloth when out of use. Rub the floor with it weekly, going up and down with the grain of the boards. The less a bare floor is wet, the quicker it takes on the polish and the darkness of age.

Water should never touch a waxed or oiled floor, no matter what the wood. Even a few drops spilled will leave marks unless instantly removed. Sweep such floors twice with the bristle floor-brush—not the weighted one; go over afterward with either a dust-mop or a broom pinned inside a towel, then clean and refinish spots or stains, and complete the cleaning by going over the whole floor with a flannel wet in turpentine, then a dry flannel or a flannel-mop, made by tacking the coarsest woollen cloth upon the bottom of a square mop-board, in such manner that the cloth stands in deep tucks between the rows of tacks. This is much easier than hand-rubbing. Finish by rubbing with the weighted brush.

A queen among house-keepers once summed up house-cleaning, and especially floor-cleaning, as "simply a matter of common-sense and elbow-grease." Both are sufficiently rare to make a perfectly cleaned house a thing of wonder and delight.

Cleaning Furniture

Wash willow and wicker in natural finish with a scrubbing-brush and plenty of warm borax soap-suds, and dry quickly—in the sun, if possible. But first dust thoroughly, and look after stains and splotches. Dry-clean varnished or enamelled wicker by rubbing it hard with a swab of prepared chalk and very fine hard-wood sawdust, tied tight in a square of cheese-cloth. When the cloth gets dirty put its contents into a fresh piece. After the rubbing, brush hard with a soft bristle-brush. Rub very dirty places with a swab of tripoli as big as the end of the thumb, dipped as lightly as possible in boiled linseed-oil.

To clean upholstered furniture, cover the stuffing with a towel and whip with a rattan, shaking the towel whenever it grows dusty. Wash all visible wood in tepid

soap-suds, dry it very quickly, then rub hard with a flannel and a few drops of kerosene. This for walnut, cherry, and oak in any finish. Mahogany needs to be merely wiped with a damp cloth, then rubbed for half an hour with a clean flannel.

Brush the upholstered parts very hard, then wipe them quickly with a cloth wrung very dry out of clear hot water. Follow this with a clean white flannel dipped in alcohol. As soon as the flannel shows dirt, wash it clean in tepid water. Otherwise the alcohol will dissolve out the dirt, and deposit it in streaks upon the surface of the fabric.

Clean out tuftings with a little swab of cotton-wool tied on the end of a stout skewer, and wet in alcohol. Throw away the cotton as soon as it gets dirty. Clear alcohol lightly used will not mark the most delicate brocades. The swab must not be wet enough to trickle under pressure.

Clean the intricacies of carved work with the same sort of swabs, but take especial pains not to have them too wet. With very delicate carving, one must sometimes have recourse to a sand-blast, using very fine tripoli, and small hand-bellows. Direct a quick stream of sand against the carving. In flying back from it, the sand brings away the dust.

Clean gilt furniture with sifted whiting made into a cream with alcohol. Cover a small space at a time, and rub off before it hardens. If a spot sticks, touch it very lightly with clear alcohol. If there is much dirt or deep tarnish, wash quickly with borax soap-suds, wipe dry, then cover all over with the wet whiting, and let it dry. Brush it off with a stiff brush, and polish afterward with a soft leather.

This is the best way of cleaning all manner of gilt frames. With very big ones, cover the floor with a sheet, then lay the frame flat, and leave it thus until after the

brushing. A gilt frame, specked but untarnished, needs to be rubbed with a flannel wet in alcohol, and polished afterward with a soft leather stretched smooth over the palm.

Brasses—as knobs, handles, and upon modern furniture—are commonly lacquered, so can be cleaned with tepid soap-suds and a soft cloth. Damp the cloth in place of wetting it, and rub quickly. Unlacquered brass can be cleaned in various ways. One of the best is to wash it well in warm soap-suds, then rub with salt and vinegar, using a flannel swab, and polish afterward with dry whiting and a clean cloth. Take care not to let the acid and salt touch the wood. If the brass is either open or intricate, it is better cleaned with tripoli mixed to a soft paste with sweet oil. Rub hard and quickly, and polish afterward with tripoli in powder.

Hangings

Shake each length separately, and hang straight over a line or trestles, right side under. Whip the wrong side hard—a dog-whip or riding-whip is better than a rattan. Brush the wrong side hard, and wipe it quickly with a damp cloth; then turn the hanging, brush the right side well, and hang it in the air. Plushes and brocades must be brushed up and down—with the warp, never the woof. Anything with a nap or pile should be brushed with, not against it. Lace and muslin hangings can be very much freshened by folding them smoothly down after shaking well, and sprinkling all the folds thickly with powdered corn-starch and magnesia. Let them lie all night, then hang for some hours in the sunshine, and whip well. The starch beaten out takes much of dust and grime with it. Use judgment, of course, in the shaking and whipping; still, even with rough handling, such a dry-cleaning does not injure the fabric as much as washing. Delicately

tinted things, as silks, cotton crapes, and so on, come through with their colours safe. This is in itself no small advantage, to say nothing of keeping their shape.

In the Garret

Neither garret nor cellar should be, as it too often is, the privileged abode of disorder. Both should be cleaned half-yearly. House-cleaning, indeed, cannot begin in a better place than the garret, since, before it ends, a good many things are likely to be sent there. Unless the garret is hopelessly cluttered, give it a coat of whitewash every spring. It need not be emptied; simply set things aside while going over one end, finish it, clean the floor, and cram everything into it, while the other end is made fresh.

Keep garret windows open, but fully screened, all through the hot weather. A frill of cheese-cloth tacked to the top of the screen-frame lets in air plentifully, and keeps out much dust. In spite of it, enough dust will get through to make a monthly sweeping worth while. No house can be daintily clean with a reservoir of dry dust at the top forever sifting down.

Garrets are made for keeping things—but not all things. Old shoes, for example. Bury, burn, give away, or sell them. With a single tree at hand it is sinful to keep the shoes out of the ground. Put them at least two feet down—nature and the tree-roots will do the rest. A grape-vine will transmute old leather into the fairest fruit and rank green leaves. In the range, under a layer of coal, old shoes make the very hottest ironing-fire. Lastly, the junkman will take them, sometimes for a "Thank you," and sometimes for coin enough to buy the young people sweets. Either way they are well bestowed —very much better than in hopelessly cumbering floor-space badly needed for other uses.

It is foolish and dangerous to litter a garret with packing-stuff—straw, excelsior, wrapping-paper, and so on. If such things needs must be kept, make them into compact bundles, wire-bound, and plainly marked. A spark or dropped match is then no menace to life and property. Fires in thousands have been set by a spark or match falling among such substances. If the bundles are boxed, and set as far as possible from the windows, all the better. The garret, a sort of catch-all, is apt to be littered all over when cleaning begins. It cannot begin better than by thus lessening a very real danger.

Gather up pamphlets, loose papers, and throw them in a barrel or big box, to be sorted over some rainy day. Pile up bound books neatly, or, better, set them in shoe-boxes, then place the boxes one upon another to form a rude book-case. Still, it is rather pitiful to keep books of any value sequestered in a garret. They had much better be given away. Books of no possible value should go straight into the furnace or the range. For bad books are distinctly the world's worst lumber, ill to keep, and worse to move. Throwing them away even is a task. In fact, burning them is the only way to get even a grain of satisfaction from them.

Go through clothes-chests, hooks, and racks carefully, weeding out their contents. There are so many things it is economy to throw away. Old hats, ragged furs, moth-eaten feathers, for example, which, each and several, may be a means of destruction to something of real value. Old felt hats must be exempted from the useless category. They can be turned into so many things—iron-holders, kettle-holders, rubbing-pads for waxed floors, rounds to go upon chair and table legs. Indeed, comfort wholly aside, the soft hat is distinctly a good household investment.

Wipe off shelves with a cloth wet in camphor before laying bundles back upon them. After the floor has been

well washed and dried, take a big paint-brush and a can of benzine, and paint it all over, going at least six inches up the whitewashed wall. This is a preventive measure against rats, mice, roaches, etc. It must be done at midday with no artificial light anywhere about. The windows must stand open after it, and the door leading down should be kept closed for some hours, as the benzine vapour is highly inflammable.

Chapter *FIVE*

In the Laundry

THE house-mother who has a laundry apart from her kitchen should rise up and call her home's builder blessed. Still, it is better to do the washing in a big, airy kitchen than to wrestle with it in a basement, ill-lit and poorly ventilated. It is, indeed, axiomatic, that washing is best done where splashing water can do no possible harm. Splashing in a cellar almost invariably means continuing dampness; thus, what is gained in space and kitchen tidiness is very often lost many times over in health and comfort. Dampness wholly aside, a cellar laundry is bound to mean carrying much weight up and down steps. Cellar drying is inadvisable. Daylight, even of the wannest and stormiest, is a wonderful sweetener and disinfectant.

Laundry Equipment

Set-tubs of soapstone or porcelain are immeasurably the best. The trouble is that in many cases they are too small and too few, especially in apartments. There it is rare to find more than two, whereas first-class laundrying requires at least three.

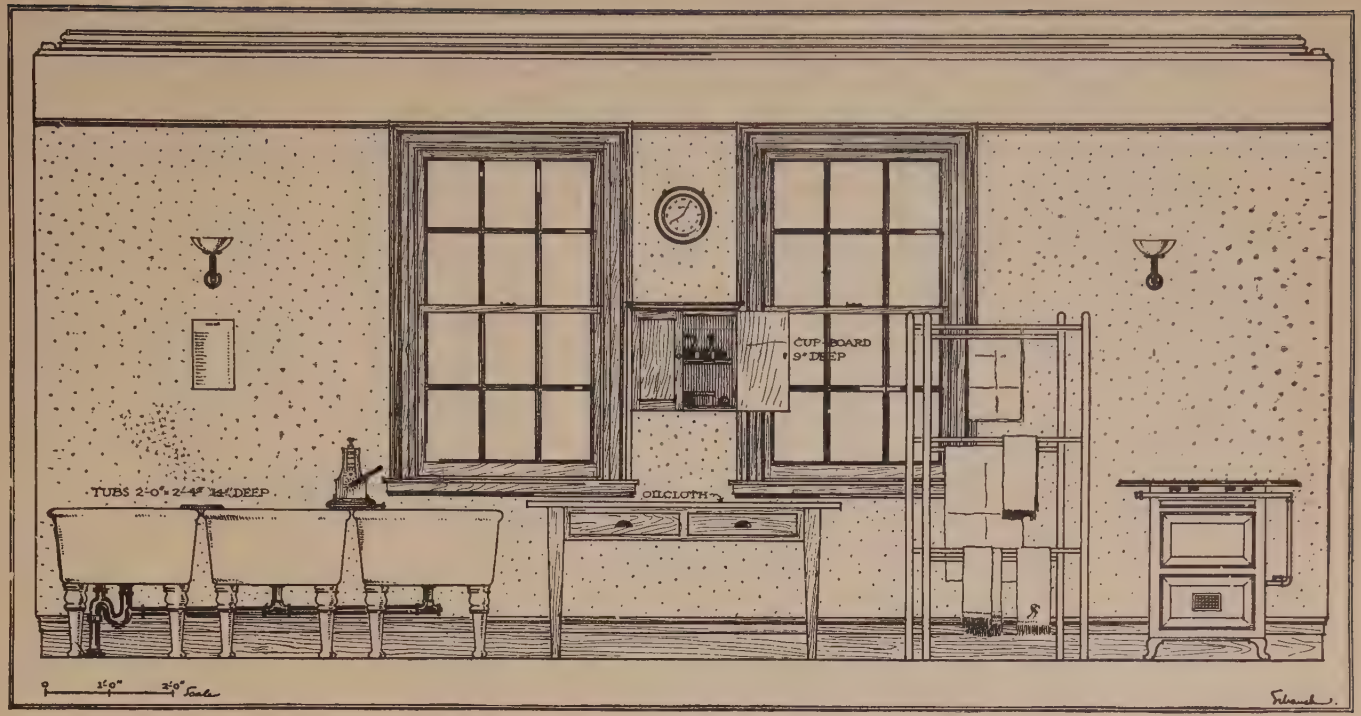
Next to set-tubs come cedar ones with brass hoops. A nest of four, fitting snugly one within another, will with reasonable care last ten years, besides being ever so much lighter and handier than tubs of pine or poplar.

Keep the tubs together between wash-days, and pour a little clean water into the upper one. This will save all from shrinking, yet will breed no smells nor mould. In use set them upon a long, stout bench, so proportioned in height to the washerwoman there will be no need to stoop much over the work. If space is scant, have the bench-legs hinged on, so they may be folded, and the bench stand or lie flat when not required.

The new glass wash-boards are clean, durable, and good for the clothes. Their one drawback is that they are a trifle heavy. Sanitarily they are far and away better than the wooden zinc-faced sort, which absorb dirt and hold all manner of taints. Indeed, it is unsafe to use wooden wash-boards unless they are carefully scalded and dried at the end of washing. One that has been used to wash clothes from a sick-room, even if there is no contagious disease, should be scalded with soda-water, and treated after to a drenching with chloride of lime. In contagious sickness, such as measles, scarlet-fever, or diphtheria, the best thing is to burn up the wash-board outright.

Wringers ought to be chosen with an eye to two things —durability and easy working. Size must, of course, depend on the tubs in use. After that, consider these things: First, how many parts? The fewer the better. Second, what sort of screws must be set? Here, again, the fewer the better. Third, the strength of the springs, the strain on them, and the sort of rubber? This is crucial, since it is the springs which insure wringing. In a general way it may be said that the simplest construction is apt to be the strongest. The length of the crank is generally proportionate to size; still, it is well to remember that the crank is, in fact, the lever through which power is applied; hence, the longer it can be without unwieldiness, the less power will be needed in the turning.

In wringing, it saves both the wash and the washer-



LAUNDRY WITH SET TUBS, TABLE, AND CLOTHES-HORSE SCREEN

woman to fold clothes to an even thickness, and exactly the breadth of the wringer-rolls. Sending things through in lumps and bunches strains the springs, and brings them quickly to the breaking-point. It is much the same with turning the crank. One vicious jerk does more harm than steady rolling on a whole wash. As soon as washing is over, dash clear warm water over the wringer, first removing it from the tub and standing it on end; then wipe it dry, put a little fresh oil on the bearings to guard against rust, and set it away in a dry place, cool enough to prevent all danger of warping.

Copper boilers are best, but cost four to five times as much as other sorts. Block-tin comes next in desirability. Next to that, a round flat-bottomed iron-pot. It is heavy, and may rust the clothes unless one is careful, but against that one may reckon cheapness, durability, and security. It does not come in holes at exactly the wrong time, as does the cheap copper-bottomed tin-boiler. The iron-pot is subject to just one danger—if cold water is poured into it while hot and empty, it is very apt to crack. But, whatever the boiler, it should never be put over the fire without at least an inch of water in the bottom.

Further, any sort of boiler must be kept clean and dry between times. Along with it keep the boiling bag, which should be of stout unbleached muslin, sewed fast at the sides, and furnished with a drawing-tape at top. Table-linen and all manner of fine white things must be boiled in it, not only to prevent iron-rust, but to keep off possible scum-stains.

Baskets and Sad-Irons

The best clothes-basket is firm and square, of light splint or willow, with strong handles. Keep a clean cloth thrice as big as the basket to go in the bottom of it, and

another smaller one, to tuck over the top. To insure the cloths being clean, provide two of each, and see to it that the spare one is washed every week. Provide also a reckless plenty of clothes-pins, with a special light basket for keeping them.

Steel-faced sad-irons with reasonably high handles, and six or seven pounds in weight, meet the greatest number of laundry needs. The variety in irons is so great, every woman should be able to find something to her mind. As, for instance, the electric-iron, which has a wire attached to the handle, and is thus continuously heated; the gas-iron worked on much the same principle by help of a light rubber-tube, and several patented contrivances whose handles never get hot. Each and all have their good points, but, when all is said, the common sad-iron is the queen of the laundry. Half-a-dozen of the six-pound weight will be none too many. There should be also two polishing-irons, two five-pound irons for thin stuffs, and a couple of the still lighter ones known as trimming-irons.

Try every one by rubbing the naked palm over the surface before buying, and reject it if there is the least roughness. It is quite as essential to keep the faces smooth; therefore do not set them upon hot coals, nor a red-hot iron, nor leave them very hot too long. High heat long continued gives rise to molecular changes that break up the surface after a little while, and make it show under the microscope numberless fine honeycomb pits. Light mats of soapstone or asbestos come in handy when the ironing-fire is too hot. Still, heat harms irons less than dirt and damp. Wash the irons as soon as they are cool enough not to hiss, rub them over with a flannel dipped lightly in kerosene, and set away. A good place for them is a stout wooden-box, set on end, with clean board-shelves across the inside. The shelves should be just far enough apart for an iron to set upright. Set

them facing inward, the heaviest at the bottom. If there is a fluting-iron, give it the upper shelf to itself, and be sure to keep the box dry and clean.

Where there is a heavy weekly wash, a small watering-pot with the finest possible rose comes handy for the sprinkling, and is ever so much handier than the tin clothes-sprinkler sold in the shops. But the very best sprinkler is a good-sized atomiser, such as greenhouse-men use for spraying plants. Choose one to fit the hand, neither too big, nor small enough to cramp it. It sends out a fine misty spray that damps clothes all over, yet makes no place sopping-wet.

Laundry-Stoves

The variety of laundry-stoves is simply without number. One that is good and cheap can be easily fitted so as to supply hot water independent of the kitchen-boiler. It has sloping spaces around the fire-pot for irons, and a specially fitted round top to hold the wash-boiler. The water-pipe is, in some mysterious fashion, coiled around inside, next the fire, then led out either to tubs or a faucet. Then there is an oil-stove, price four dollars, which will keep three irons going, and hissing hot, at a cost of less than two cents an hour. It is, withal, so handily portable one may iron in the airiest room of the house with no danger of defacing it. If gas is available, it is barbarous to iron in a hot kitchen. One of the long stoves with perforated burners, each of which heats an iron, can be set outside the door of a hall-bedroom, and prove a god-send to either mistress or maid.

Ironing-Boards and Tables

An ironing-table ought to be high enough for the ironer to bend her elbows at right angles and work with-

out stooping. In reckoning the height, allow for a thick mat or excelsior cushion under foot—it is a great economist of strength and backaches. Pick out sound deal, free of knots or warping, and see that the drawer works easily. To furnish the table properly, take first a soft, coarse all-wool blanket, fold it by a warp thread, lay the fold upon a long edge of the table, and make very smooth, then trim all round, save at the fold, exactly to the size of the table-top. Whip the cut edges lightly together as it lies, first making sure that the under-side is as free of wrinkles as the upper one. Cut a four-inch square of stout muslin for each corner, double the squares to triangles, and sew them fast. Their use is to slip over the corners of the table, thus holding the blanket in place. When the blanket is washed, take off the squares, and remove the whipping from the edges.

Make ironing-table covers of unbleached sheeting. Cut them three inches bigger than the table-top all round, hem the edges narrowly, and mitre three of the corners, sewing them fast. At the fourth corner fold back the extra cloth, stitch it down, then in the double, work a couple of eyelets either side, and lace a tape through them. By tying this tape tight, after slipping the mitred corners over the table corners, all need of pins is done away with, and a firm, smooth, unwrinkable surface assured.

Cover skirt and sleeve boards the same way—first, with double woollen cloth sewed firmly on, then with removable muslin-slips, hemmed at the small end, and laced snug over the large one. Fit under and upper covers so well either side can be used. A bosom-board is a necessity in doing-up shirts. It should be either square or shield-shaped, and smoothly covered with double flannel, with fine cotton outside. For ironing laces and embroideries, have a square of very thick card-board covered four-fold with flannel. If there are many children to iron

for, a small-size skirt-board, and several sizes in sleeve-boards, soon pay for themselves in saving time.

Provide the ironing-table, further, with either a light trivet or asbestos mat to hold the irons, a clean wiping-cloth, a shallow wooden box with salt for rubbing a rough iron smooth, a smaller box for either white wax or white soap, and at least three clean, soft holders. In addition, furnish the laundry with a folding clothes-horse of white wood, which may be turned into a screen as clean clothes are hung on it; a big starch-kettle, agate-ware or copper or block-tin; several cheese-cloth strainers, and at least three sheets of cheese-cloth to cover the clean clothes while they air after ironing.

Wash-Days

The quickest thorough washing is a long way the best. Except for very dirty things, soaking hinders cleanliness rather than helps it. But here, as elsewhere, haste is best made slowly. Sort the clothes very carefully before a piece is wet. Wash table-linen first, then bed-furnishings, then skirts, night-gowns, and so on; then coloured things, next stockings and underwear, and, last of all, the soaked bits.

Even with set-tubs two wooden ones of handy size help out amazingly. One had better be kept especially for table-linen, and for rinsing the finest white things. Use the other for soaking, but do not soak too long. An hour is enough to soften and dissolve the dirt, yet not long enough to set it all through the garment. Soaking in suds strong with soda will eat and destroy the fabric, but dirt comes out easier and without damage to the fibres if the soiled things are wet through with and well wrung out of warm soda-water before they go in soak. This wetting and wringing out will whiten and sweeten, without hurting the clothes. The caustic soda attacks the

dirt first, and is washed out or dissolved away before it has time to eat the fabric. It must not be too strong—a tablespoonful of soda to three gallons of soft water is about the right proportion. Hard water requires a fourth more soda, as some of it goes to neutralise the lime.

Keep a sharp look-out for spots and stains in the sorting. Either wet fruit-stains in alcohol, whisky, or camphor, or pour a stream of full boiling water through them. A stain once set by suds is thenceforth almost hopeless. Beware especially of grass, paint, mud, and wagon-grease marks, all of which must be taken out before washing or not at all. (See Chapter on Restorations.)

Borax-soaps, which are white and mild with but little free alkali, are the best for laundry work. Soap is properly a salt, a combination of fatty and resinous matter with an alkaline base. In a perfect soap the ingredients exactly balance, but in many of the cheaper grades there is an excess both of alkali and resin. This is why washing-powders so often play havoc in the tubs. In soap-making the heavier ingredients settle at the bottom of the vats. It is this residue, dried, crushed, and mixed with free alkali, in powder—as soda, potash, borax—that is sold as washing-powder. It unquestionably has cleansing power, but must be used with extreme discretion.

However, any decent soap, or even soap-powder, will answer if only none of it be left in the clothes when washing is over. It saves both time and strength to dissolve the soap before washing begins. Shave a bar fine, cover the shavings with water, and set over a slow fire until it becomes a jelly. Hot water takes out dirt more quickly and more readily, but cold may be used at convenience. The essential thing is to keep it the same temperature all the way through. Indiscriminate alternations of hot

and cold "full" all sorts of fabrics, and make them dead and coarse-looking. Lukewarm water is best until one comes to the boil. Fill the boiler with cold water at the minute of dropping in the clothes. Take them out after twenty minutes' boiling, and drop them into a cold rinsing water. Rinse a second time in lukewarm water, and have the blue water of the same heat. Remember the drier and quicker the wringings, the whiter the clothes. It is the remnant suds and dirt which make them yellow, and it is almost impossible to rinse out the suds if they are left to lie long.

Kerosene in the boil whitens clothes safely, especially such as are yellow from long lying. Use a tablespoonful to a gallon of water. For things very yellow or grimy, make an emulsion of kerosene, clear lime-water, and turpentine in equal parts; shake together until creamy, then add a cupful to a boilerful of clothes, and keep over the fire half an hour. The same emulsion is good for very dirty things, as jumpers, overalls, working-shirts, children's trousers. Use it in conjunction with very strong suds, as hot as the hand can bear, and rub it well upon the dirtiest spots. Leave the clothes five minutes before washing out, and be sure the second suds and the rinsing waters are as hot as the first suds.

Drying Clothes

It is nearly as essential to hang out things properly as to wash them well. If big things, such as table and bed linen, dry out of shape, stretching and pulling them straight wears them more than use. Hang sheets, tablecloths, towels, and napkins evenly across the line, ends down. Warp-threads are so much stronger than woof, if things are habitually hung out lengthwise they will certainly split along the fold. Indeed, all washable things should be so hung out that the weight while wet—which

is thrice the weight dry—comes upon the lengthwise threads.

Take pains to hang out shirts so the bosoms will not drag. Once the several thicknesses dry in creases, it will be hard work to get them back in shape. It is the same with cuffs and collars. Snap them out straight, and hang so warp and woof pull true. All these stiff and polished things need to get bone-dry before starching. They also need to be well wet in blood-warm water before rubbing in the tubs. Stiff linen is nearly as breakable as cardboard, especially the fine sorts used in good shirts.

It is not hard to do up shirts when once the knack is learned. After washing and drying comes starching. Make the starch by rubbing one tablespoonful of dry starch smooth in a little cold water, then stirring it into a quart of freshly boiling water. Let it cook about two minutes, stirring all the time. When it turns from white to a translucent blue, it is done. Add to it a bit of white wax, paraffin, or spermaceti, as big as a nutmeg, a teaspoonful of salt, and two tablespoonfuls of thick gum-Arabic water. Use only the whitest gum, and put four ounces of dry gum to the quart of water. It may be made in quantity, and kept for use bottled and tightly corked. Cook the starch a minute after all the other things are in, stirring it hard, and taking care not to scorch it. Scorched starch not only taints the whole house, but gives the clothes an ugly tint and a very bad smell, which it will take several washings to remove. Strain through double cheese-cloth while boiling-hot. Make a cupful of very strong bluing-water, and stir in enough of it to colour the starch rather deeply.

Fold a shirt-bosom lengthwise down the middle, dip it in the hot starch, and rub and knead with both hands until sure the stiffening has gone well through it. Wring very dry, and hang out as smooth as possible, then look the bosom carefully over, and wipe off even the least

smear of oozing starch. If there are air-bubbles between the linen and the backing, stick a pin in them and press the plies together. Starch cuffs and collars in quite the same way, taking especial pains to have them dry straight. Leave on the line until full-dry. For sprinkling, lay flat on the table, bosom up, dampen the whole side thoroughly, but do not make wet; then fold the sides and sleeves over the bosom, dampen the under sides and roll up tight, beginning at the neck. Let lie an hour.

The Way to Iron Shirts

For ironing fold the shirt straight down the middle of the back, and iron the body smooth, taking care to move the iron mainly straight with the warp. Next fold a sleeve flat along the sloped seam, and iron it upon both sides. Iron first through the middle, then take hold of wrist-band or shoulder with the left hand, and hold taut while the iron goes quite to the join. Open the wrist-band, lay it flat, and iron hard upon the wrong side, then turn and press upon the right side. Next iron yoke and neck-band. Then comes the tug-of-war—otherwise ironing the bosom.

First fasten the neck-band properly, next slip the bosom-board inside the shirt, and spread the bosom smooth upon it, pressing it out simultaneously with both hands. With a thin clean cloth wet the whole linen-surface lightly with weak raw starch. Rub it in very well, and, if any place feels sticky, wipe it off with a cloth dipped in tepid water. Have the iron hot enough to yellow dry cloth if left to stand on it ten seconds. Begin at the bottom of the bosom and iron straight toward the neck, up the middle, holding the neck-band in the left hand, and pulling hard against the iron. Here as much depends on the left hand as the right—the knack lies mainly in knowing how to pull properly.

If the bosom wrinkles, or forms one of the warps known to laundresses as " cat-faces," wet the place with clear water, stretch it smooth, and iron over again. Rub the iron over with white wax before beginning work, also in the salt tray, to insure a perfectly smooth surface. If the starch is right, properly made and applied, it will not stick to the face. But if a yellowy crust forms upon the iron-tip scratch it off with a blunt knife, and be sure to wax and salt-polish the iron again before setting it on the shirt.

When the whole bosom is smooth, and nearly dry, take one of the polishing-irons, not quite so hot as the others, rub the face of it with either polishing-wax or white soap, and press the bosom hard all over, bearing hardest upon the rounded iron-point. Iron and polish cuffs on a flannel-covered board. Wet them also with raw starch, or, more properly, starch-water, press first upon the wrong side with a very hot iron, and turn upon the right side only when nearly dry.

Washing and Starching Prints

Before a new print goes into the tub, set the colours. The way of doing that depends on the colours. For green, blue, pinkish purple, mauve, and aniline reds, soak ten minutes in alum-water, using four ounces of alum to a tub of water. For the madder tints, soak in sugar-of-lead solution—an ounce of the salt to a gallon of water. For black, black and white, grays, and deep purples, dissolve a handful of coarse salt in a tub of water, and soak about seven minutes. Some blacks are made fresher and more permanent by putting strong black-pepper tea into the first suds. It is best to try the colour of anything by wetting a small piece in the various solutions, and using that from which it comes out brightest.

Prints should never be allowed to get so dirty as to

demand soap. But if they do get very dirty use borax-soap, but do not let it touch the cloth. Make a strong suds, as hot as the hand will bear. But never let boiling liquid touch any printed surface. Borax, in proportion of a tablespoonful to the gallon of water, is a milder cleanser, and in most cases efficient. Wash through it quickly, rinse twice, in water a little cooler than the first, and wring as dry as possible. Never stop for a minute—standing after wetting is what makes colours run.

Prints merely crumpled and dusty had better be washed with wheat-bran than soap. Tie a quart of the bran loosely inside a piece of cheese-cloth, and rub the prints with it as though it were a cake of soap. Press the bran-swab well into all folds and gathers, wash the clothes rapidly in the water, which will be milky-looking, and should be barely lukewarm so as not to cook the starch washed out of the bran. With very dirty frocks a fresh bran-swab may be needed. For dark grounds or black put a handful of salt in the bran-water. Rinse in three waters. Blue the last of them if there are white grounds or much white in the pattern. For buff, brown, or cream grounds, colour the last rinse-water with either strained black coffee or strong hay-tea. To make the tea, boil a lock of bright timothy hay in a gallon of water, strain, and bottle, adding enough alcohol to the bottles to keep them from souring.

Sunshine bleaches out a wet print, often fatally. Notwithstanding, prints cannot be dried too quickly. Never hang a printed skirt double over the line. Fasten the band over a wooden barrel-hoop and hang in shade. Lacking a hoop, stretch it around the backs of two chairs set face to face, letting the band come in the middle. Let all sorts and conditions of coloured cotton and linen dry thoroughly before starching. Mourning prints should have the special black starch sold in the shops. Make yellow starch for yellow and brown prints, colouring it

with either coffee or hay-tea. For white grounds have the starch rather blue, and less than half as thick as that for shirts.

Turn everything wrong side out before dipping in the starch. Knead and rub the starch well through, but never let it run upon the right side. Dry quickly, but still in the shade, and do not take down while one thread is moist. This is for thick things—prints, chintzes, ginghams, chambrays, linens. Airy muslins, organdies, batistes, and so on, require different usage. The best starch for them is clear thick gum-water, white gum-Arabic, or gum-tragacanth. Dip them wrong side out, rub the gum well through, and squeeze dry, but do not wring. Spread as much as possible, and leave until the surface feels limp and a little sticky, neither wet nor dry. Take down, roll tight, and cover with a clean cloth. Unroll a breadth at a time, and pat and clap between the hands until quite dry. This is "clear-starching," no end troublesome, but worth while, since it is the only process that restores the clear, fresh new look to thin fabrics.

Sprinkle a clear-starched garment very lightly, but evenly. Wet splotches upon a semi-dry ground ruin everything. Any fabric that hisses under the iron is too wet. Thick prints take much more water than muslins, but excess is quite as harmful. Leave any sort of print tightly rolled at least an hour after sprinkling. Cover it so thickly the outside cannot dry. To iron a skirt properly is in the nature of high art, especially in these days of tucks, ruffles, and flares. Iron the trimming first—unless it chances to be ruffles that are to be fluted later. Press tucks first along the line of sewing—any sort of sewing draws for wetting. Hold the tucks hard with the left hand, after smoothing perfectly, and go over them with an iron just below scorching heat. If they run around, press them out on the table; if up and down, slip the skirt upon the board, and iron the whole tuck-

length at once. At the belt press the iron-point well up among the gathers, holding them in the left hand while the right moves the iron.

Iron untrimmed skirts first all over upon the wrong side, turn and press very lightly upon the right. Never iron anything out of shape—that is, with the threads pulled out of their proper right angles. The best way to keep from doing it in ironing waists, yokes, etc., is always to iron with the warp-threads, and hold them straight in front of the iron.

Washing Curtains

Thin curtains—Madras, bobbinet, muslin, or Nottingham lace—should be shaken free of dust, washed in warm suds, squeezing, and laving up and down in place of rubbing; boiled, rinsed, blued, or yellowed; lightly starched while still wet, and dried as quickly and as straight as possible. Instead of ironing, baste broadish hems at top and bottom, and run into each a stout unpainted curtain-pole, as long as the curtain is broad. Stretch the curtain smooth upon the pole at each end, then hang up, sprinkle well, and let dry. The weight of the lower pole will straighten and smooth it. Repeat until all the curtains are dry, then rip out the hems, and press lightly with a warm, not a hot iron. If there are wrinkles or cat-faces after hanging the curtains, wet those spots, and pull down hard upon them. Usually they will dry out as smooth as need be. Ruffled curtains can have the ruffles fluted after coming off the pole. If hanging is impossible, simply stretch the curtains between the two poles. Take care that the poles are very smooth, and stout enough not to spring.

Real-lace curtains after washing can be pinned out upon sheets spread upon the floor—tedious work, but worth while. Pin the corners first, drawing them very square,

then stretch every scallop in line with the corners and pin it fast. After all are pinned, go over the whole curtain with a soft damp cloth, patting it hard enough to remove the least trace of starch. This makes the curtains look quite new, and does not wear them in the least. But with several pairs it is apt to be impracticable—then the recourse is to frame-drying. No sort of lace should ever be ironed, not even upon a mangle.

For the frames, get clean stout deals, one by two inches and twelve feet long. Saw some in half for end-pieces. Bore half-inch holes four inches apart for two feet from each end. Have also some half-inch wooden-pegs long enough to go through two of the deals at once. Let the curtains half dry upon the line, hanging them as straight as possible. Take down a pair, pin scallop to scallop from top to bottom, and hang the pinned part over one of the long deals. Now pin the low edges as accurately together, slip inside them another long deal, stretch the breadth of the curtain apart, lay on a short end-piece, bringing the holes in it over holes in the side-pieces, and fasten with pegs. Likewise stretch the other end; then with a needle and coarse thread fasten the ends of the curtains to the cross-bars. Stand on edge in an airy place to dry. Six frames, or three pairs of curtains, will thus take up less space than one curtain spread out full-size.

Stockings and Underwear

To wash silk stockings and underwear, first soak for ten minutes in fairly strong borax-water, then wash rapidly, rubbing as little as possible, through good white soap-suds about blood-warm—that is to say, about 98 degrees. Hotter water makes knit-silk harsh and crinkly. Squeeze out the suds, but do not wring. Rinse through two waters of the same temperature as the suds, and hang to drain and dry without wringing. Hang

shirts and drawers smooth, and pull the sides a little apart, but not out of shape. As silk dries, so it is apt to wear. White silk needs a little bluing in the last water. Coloured silk is best left without.

Do not sprinkle knit-silk to iron it. Wring a thick towel out of clear hot water, fold up the dry garment in it, and let lie an hour. Make very smooth upon the table, and press lengthwise with an iron just below scorching heat. Fold stockings wrong side out, along the seam, and press from the seam outward, taking care not to wrinkle the under side. Fancy lace-woven stockings in white and light tints need to be cleaned in a flood of benzine. Lay them flat in an earthen dish, and deluge them first upon the wrong side. Wash up and down, until the benzine is dirty; then lay in a clean dish, right side out, and pour on more benzine. All that remains is to air them sufficiently to remove the smell, which commonly requires a week.

Wash heavy stockings and underwear, whether all-wool or mixed, as though they were flannels—that is, in lukewarm borax soap-suds, with little rubbing, and no machine-wringing. Dry as quickly as possible, but in the air rather than by artificial heat. Shape on the line, so ironing will not be needed. Ironing, indeed, shrinks woollens nearly as much as washing, hence should be left off when possible.

Black-pepper tea will freshen the colour in both black and brown stockings. So will a washing in salt water before suds touch them. The salt bath need not be repeated after the first washing. But, whatever is used or let alone, remember always to shake stockings hard, turn them and shake again before wetting; also not to wash them in dirty or linty suds, after all the other things. Though they come properly toward the tag-end of washday, they fully deserve separate clean suds. Damp very lightly for ironing, and lay in shape before the iron.

Wet very dirty socks or stockings, as those of workmen or small boys, with kerosene, and let them lie half an hour. Then cover them with very hot water, made slick with either soda or ammonia, stir them rapidly around in it with a wooden paddle, fish out in a minute or so, and wash in clean suds. It will not be hard washing—most of the dirt will have been left behind. But beware of leaving them too long.

Some Small Helps

Ironing is, when all is said, tedious work, and trying. But it may be made less so by a few simple expedients. One is the floor-cushion before mentioned. Make a flat pad of excelsior, three inches thick, and big enough to stand comfortably upon. Another is the knee-board—three feet long, thin and light—which may be held on the lap, thus making it possible to sit while ironing small things such as napkins, handkerchiefs, and collars. Another—this for table-linen—is the roller. Get a big cardboard mailing-tube as long as a folded table-cloth is wide. Fasten a narrow ribbon inside the tube so a yard hangs out of each end. Then, when the freshly ironed cloth lies long and white, instead of folding it, roll it up about the tube, keeping it straight and smooth. Tie down the end with the ribbon, cross the strings, pass them around the roll, and tie on the other side. Thus the cloth keeps its unmarred smoothness, yet is easy to handle, and easier still to store in the closet.

Chapter *SIX*

Cleaning of China, Glass, and Metal

THE woman, "mistress of herself though china fall," is a rare personage. One at least among the fathers of the church laid it down as incontrovertible that a woman needed to be sustained by the grace of God as much when she broke a cherished plate as when she lost a cherished child—the difference was, she did not need quite so much of the grace in the first case as the last. Wherefore it is the part of pleasure, as well as of wisdom, to learn all that may be taught in regard to the care and keeping of treasures breakable and tarnishable.

Washing Glass

"If it were done, when it were done, then 'twere well 'twere done quickly," is the precept for washing all sorts of fine glass—cut-glass especially. Standing in water, no matter how clear, robs the cutting of lustre, and puts it almost on a level with pressed glass. Still, one must make haste slowly. Begin the haste some time before the beginning of washing. No matter if there is but a single bowl, wash it apart from everything else, and in perfectly clean water. If the bowl, or dish, or saucer is caked and sticky inside from standing after use, fill it

with blood-warm soda-water, and shake it vigorously for a minute, then repeat until the glass begins to show clear.

With any very fine or frangible glass, as cut-glass, cameo-glass, iridescent and Bohemian ware, especially pieces that have slender stems, or necks, or handles, set the pieces securely in a broad, shallow tray, covered with a double cloth, soft and clean, and place the tray upon the table at the right hand of the dish-pan. If the sink is some way off, set a basin for rinsings in front of the pan, and a pitcher of moderately hot water between the basin and the tray of soiled glass. An agate-ware pan not too small is best. Fold a soft, wide clean towel in four, and lay it at the bottom of the pan. Then pour in water, hot and cold. Half-a-gallon strictly boiling water to three quarts of cold gives about the right temperature. Put a tablespoonful of ammonia to the gallon. Use also a little white soap. Never let yellow soap touch glass of any sort—the resin in it makes a cloudy dull surface.

Put in the glass, a piece at a time; thus alone is one insured against chipping or cracking. Have a clean soft wash-cloth, also a very soft brush. Wash the glass quickly, using the brush on all the cutting, then pass it through a pan of rinsing water. The rinse-water needs to be a little hotter—one-half fully boiling, and the heat kept up by adding more boiling water from time to time. Do not keep the glass in it longer than a minute, wash it vigorously about, then turn upside down over the pan, and set, still upside down, upon a draining-board, covered, like the pan-bottoms, with a folded towel. Let it drain until the next piece is ready for the board, then take up and plunge in a deep box of fine sifted sawdust, either oak or white wood. No resinous or gummy wood gives dust fit to use. If the dust is hot, all the better. It should be kept in a clean bag, and hung over the stove, or laid inside a warm oven some little time before it is

wanted. After use, it must be dried, bagged, and put away for next time. The sort known as " jewellers' sawdust " is always safe. The best jewellers use it for drying fine metal-work after it is washed and polished. Take the glass out of the sawdust, brush with a very soft thick brush, and polish with a clean soft cloth. If there is no sawdust-box, wipe and polish after a few minutes' draining. Glass must by no means be allowed to get cold while damp. Use dry towels all the time—wiping with a wet towel is worse than no wiping. Do not use towels either conspicuously new or old. New ones are too hard and wiry to take up every bit of moisture; old ones shed lint, leaving their mark wherever they touch. The very best linen-crash, specially softened by several washings and bleachings, and kept solely for glass, is the thing to use.

Care of Decanters

To clean decanters and claret-jugs, if they are not finely cut, drop half-a-dozen buckshot inside, with half a pint of warm soda-water, and shake vigorously. If the decanters are much crusted, fill with soda-water to the stoppers, and let stand six hours. This will remove the crust, but must be followed by a little vinegar, shaken well around. Fragile, deeply cut bottles must be cleaned with alcohol and coarse brown paper. Cut half-a-dozen squares, three inches across, from the stiffest, roughest paper. Fold them lightly, and crowd them down the bottle-neck, then pour in half-a-cup of alcohol, put in the stopper and shake hard, holding the bottle sidewise, and shaking it round and round. Pour off the alcohol—it can be used again—fill with clear water, half-boiling heat, shake hard, let stand a few minutes, then shake and wash as directed.

If milk, cream, custard, ice-cream, or any of the fancy gelatine desserts, have been served in cut-glass, take par-

ticular pains that none goes into the washing-water. Rinse such things off first in cold water—poured in, shaken well round and emptied, then in blood-warm water, and in still a third water a little hotter, if the inner surface is cloudy or sticky. All the things enumerated, if once well washed into the fine lines of the cutting, are nearly impossible to get out, and, aside from their own dimming, gradually take to themselves other fine grimy particles until they half-destroy the beauty of the glass. In washing soda-rinsed pieces, take them up firmly, shake quickly, so as to set the soaking-water swirling, and empty it into the slop-basin or sink, taking care no drop goes into the pan. With hot-water faucets, and big generous sinks, there is a great temptation to wash all sorts of glass in the running stream. Resist it valiantly. Such washing invites disaster. It is wholly impossible to regulate the temperature of such a hot stream, and nothing is so apt to break a big costly piece of cut-glass as raising the temperature of one part a few degrees higher than that of another. The cost of one such piece will pay three times over for all the special appliances here directed.

How to Polish Glass

Once a year polish all sorts of fine glass this way: Sift some powdered French whiting through fine silk gauze, to make sure there shall be no coarse particles, put the siftings into a fresh gauze-bag, turn the glass, freshly washed, upside down upon a cloth-covered table, and dust it thickly with the whiting. When the last piece is dusted, begin on the first, and, with a soft clean cloth, rub the whiting off. In the cuttings brush it out with a very thick soft brush. Hold the glass with a cloth while brushing; never touch it with the bare hand in either wiping or polishing. Do not bear hard upon thin bubble-like pieces; they are almost sure to crush under a

heavy hand. As each piece is polished, wipe it all over with a perfectly clean cloth, and set away. In setting away, be sure no piece touches another at the side. Very small things, as nappies and salts, may be lightly piled, but those of any weight should stand separate.

Plain and Decorated Glass

Pressed glass is so cheap, so plenty, and so pretty, there is no excuse for even the humblest household's lacking a full supply. Thin tumblers, nappies, bowls, pitchers, water-sets, and so on, may have their usefulness prolonged if treated as directed for lamp-chimneys. (See Chapter on Lighting.) They need, further, to be well washed in hot soap-suds—not yellow soap-suds—rinsed, dried with clean soft towels, taking care to leave no lint, then to cool separately, and be set level in putting away. A glass or pitcher canted is almost certainly a glass or pitcher broken. Plain clear glass well kept is much handsomer than imitations of cut-glass. But, if one has a taste for the cut patterns, remember to wash them out with a stiff brush at least once a month; only thus is soap and dust removed from the deeps of the pattern. In patterns, those that are bold are better than elaborately fine ones. Use soda-water for the brushing out, and rinse after it until the glass does not feel slick. Dry with towels soft enough to crowd down into the crevices, and, once or twice a year, polish with sifted whiting, not dusted over, but rubbed on with a swab of absorbent cotton tied loosely in soft old silk.

Frosted glass needs especial care. The rough surface may easily become unsanitary, particularly if it is used for milk or porridge. Wash it weekly with a stiff brush, and either soda or ammonia in the water. Rinse and dry. Occasionally such glass is helped by putting it in cold water, so it is entirely covered, and bringing the water

gradually to a boil. A pitcher too small to have the hand go down inside should be well mopped out, taking care to scrub the whole interior surface. Clear glass is its own inspector, but that which is by nature clouded or coloured must be watched vigilantly.

Gilt glass, either Bohemian or imitation, must be very quickly washed in ammonia and water, dried gently, and polished sparingly. No matter how careful the handling, the gilt will wear more or less. Rare Venetian glass in gold and delicate colours should be washed inside with ammonia and water and a fine linen cloth, and cleaned outside with bits of the softest white silk, first with one dipped in alcohol, then rubbed with a dry one, and, after that, polished with a third cloth just touched with the finest sifted whiting.

Washing China

A big high-faucetted sink justifies rinsing well-scraped things in the running streams, but they should be washed in a roomy dish-pan three-parts full of hot suds. Rinsing under the faucets before washing, as well as after, keeps the dish-water proper, clean. Whenever it gets dirty enough to show floating cakes on top, empty it. Never rub soap of any sort, and especially scouring-soap, directly on patterned ware. Soap is particularly ruinous to gilt, and, though it does not greatly affect well-fired colours, it sticks so it is very hard to get off. Make the suds fairly strong, and add more soap as needed. A mop is best in some hands, a soft dish-cloth in others. Whatever is used in the washing, the most rigorous cleanliness cannot be too much insisted on. The great drawback to mop-use, indeed, is that it requires such nice care to keep mops wholly clean. Either mop or cloth needs to be well washed in clean hot soap-suds, rinsed, and hung to dry and air, after each using. Neither

should be used too long. The minute a cloth begins to fur, a mop to rag, throw it away.

The rinse-water should be something hotter than the washing-water, but beware passing china, or, indeed, any sort of ware from cool or even tepid water into hot, or *vice versa*. It may not break outright the first time, but it will lose something of temper, and soon show chips or cracked glaze. Cracked glaze has another root—piling hot plates or platters one in the other after wiping. Every piece should be allowed to get almost cool before another is set in it.

Few things are more hazardous, or more apt to ruin good ware, than rinsing with both hot and cold water running. Neither hot nor cold alone will do damage. It is the alternation that is perilous. Heat expands clay —very much less than metal, to be sure—but still enough to disturb the arrangement of particles. The faintest swelling underneath the glaze will destroy the surface. When glaze cracks badly, throw away the dish at once. Such cracks gather to themselves part of whatever goes in the dish, and hold it past washing away. But they do not hold these particles so firmly that hot liquids, or, more particularly, hot grease, may not seep in and force them out. Thus the dish may poison what was pre-eminently wholesome. Ptomaines come from stale animal and vegetable matter. A crack half an inch long may breed enough of them to kill a strong man.

Drain dishes well after rinsing, but do not let them dry. They will never feel clean. Neither will they feel clean if the rinse-water is so hot they dry themselves almost the moment they are out of it. Hot things can be wiped much easier than cold ones; they also feel and smell better. A perfectly washed piece of ware has no perceptible smell of dish-water. Such washing is impossible without a clean pan, good soap, plenty of water, and a great plenty of dry clean towels.

For washing egg-shell or other very fine china, put a folded towel in the bottom of the pan as directed for glass. The use of it is to save breakage, both in turning about or by accidental dropping. Put in only what the pan will hold comfortably; wash, rinse, drain, and wipe, working quickly. Do not leave fine china soaking in the water. Add fresh hot water as needed, or fill the pan anew. In clearing a table, take the things that are not greasy first, as cups, fruit, and cereal plates. All the glass must be washed before china, and set away to air and cool. Set away likewise the first washing of china before beginning upon greasy and heavy things.

As to Knives

Whoever has two sizes of knives needs also two sizes of knife-pitcher. A knife-pitcher is a tin vessel stout and squat, specially made and provided to save knife-handles from the wreck and ruin of hot dish-water. Any sort of knife-handle, from wood or horn to pearl and beaten gold, must be kept from soaking, if it is not to part company with its blade. The fact goes far to explain—almost, indeed, to justify—the prevalence of the so-called silver knives all in a piece, although they are among the heaviest and clumsiest bits of table-furnishing.

Gather up the knives early in the dish-washing fray, wipe off the blades with crumpled paper, then stand the bunch in a pitcher of proper height, pour very hot water over the blades—be sure not to pour it also over the handles—add a little soda-water, and let stand till everything else is done. Wash singly and quickly through clean suds, taking care that no dirt is left at the join of handle and blade. Rinse in lukewarm water, and dry while warm. This unless there are spots on blade or handle. Spots on ivory should be rubbed out with tripoli, mixed in sweet oil, and a clean flannel. Mother-

of-pearl seldom spots, but may be stained by fruit-juice or any acid running down from the blade. Wash very clean, then rub lightly and quickly with a little sifted whiting wet with alcohol. Wash clean after the rubbing, and, when dry, polish with dry whiting and a flannel or silk cloth.

To clean steel knife-blades easily and quickly, cut a good-sized potato in two, dip the cut surface in bath-brick or powdered rotten-stone, lay the knife-blade flat upon the table, and rub the spotted surface hard with the potato. In a minute at farthest it should be bright. Wipe dry, wash, dry again, and polish with a little dry bath-brick.

Silver knives stained with egg or vegetables are best cleaned by wetting, dipping in fine salt, and rubbing with a wet cloth. To polish such knives and keep them bright, rub them fortnightly with whiting, and afterward with a soft clean flannel. Use helps amazingly to keep such cutlery in the best order, but spare knives will take no harm if they are washed thoroughly, rubbed clean, wrapped separately in soft white paper, and put away in a tight box. Silver chests and leather cellarettes are handsome, and excellent things to have, but the plain tight box, dark and trig, is better for preventing tarnish than all their bedizenment of shaped trays and velvet rests.

Carving-knives and forks need to be very well washed, then to have a cloth over the point of a skewer run all round the join. If they have horn handles, the same skewer treatment should be applied to the horn ridges, or else the ridges should be washed out with ammonia and water and a very stiff brush—brushing with the grain of the horn. It goes without saying that carving-knives must be razor-edged. To insure that, first buy good steel, no matter what the mounting; then, once a year, have the blade properly ground. In between keep it sharp and true by help of a long whetstone such as is

used on mowing-scythes. It can be bought in any big hardware-store, should not cost over a quarter, and will last a lifetime.

Silver—Keeping and Cleaning

Big pieces of silver—as baskets, trays, loving-cups, centre-pieces—when not on show should have each its special Canton-flannel bag, made with the furry side in, and furnished with secure drawing-tapes at top. Put the vessel in the bag after cleaning it, draw the strings tight, then store in its case, if it has such a thing, otherwise upon its shelf in the plate-closet or safe. If there is fine chasing or hammered work outside, after the vessel is in the bag, pack jewellers' cotton securely all round it. In case of very fine work, too delicate to bear much cleaning, pack jewellers' cotton outside and in, then wrap well in paraffin-paper, twisting the ends securely, put in the bag, draw the strings tight, tie them, then tie the ends about the bag-mouth below the drawing. Gas—either sulphuretted hydrogen, or coal gas, or illuminating gas—is the most active agent in tarnishing silver, and such packing comes near to preventing gases of any sort from touching its surface.

Wash silver in hot suds made from good white soap, with a little ammonia added, and rinse in water as hot as the hand can bear. Wipe with clean dry towels. Change the towel as soon as it is damp. Wash all the silver at once, after glass and china are out of the way. When the last piece is wiped dry, begin on the first, and rub it quickly over with a wash-leather or piece of clean Canton flannel. This brightens it amazingly. Silver so treated every day will not require to be rubbed and polished oftener than once a year.

In washing silver lay aside tarnished bits for special treatment. Egg-stains are removable with wet salt, or

a paste of ammonia and whiting. The black marks which spoons gather from contact with certain green vegetables sometimes yield to a rubbing with alcohol. If they are obstinate, add a little whiting, and rub very hard. But in rubbing silver, especially small silver, take care not to bear so hard as to spoil the shape.

Never beat up anything, not even a single egg, with a silver spoon. Wooden, tin, and iron spoons are so cheap, it is vandalism of the first water to put silver to kitchen uses. Bear the same sort of conscience toward silver forks; they are out of place in dishing meat, pricking pies, or marking crust. Every kitchen should have its special steel forks for such purposes, just as it has special spoons. There should be china or triple-plated spoons of several sizes for measuring things like lemon-juice, tarragon, mustard, or onion-juice, which canker a tin or pewter spoon. Silver-plated things are, indeed, so cheap and good, they are almost indispensable in the kitchen. They should not be used too long; after the plating wears appreciably, throw them away.

Take a day for cleaning silver; if possible, a bright day, and work where there is a good natural light. Silver surfaces do not show true by artificial light; that is to say, one cannot always tell if canker and tarnish have come away leaving no mark. Clear off a roomy table, and cover the top of it with a thick cloth, folded. Wash the silver upon another table, using scalding-hot white soapsuds, with plenty of ammonia, rinsing in hotter water, and drying lightly with soft cloths. Set the pieces as wiped upon the rubbing-table in orderly array. Keep small things—forks, spoons, and so on—in sets. Count the sets as they are taken out; every case should be plainly marked outside with the number it holds, whether the set be full or broken. Keep cases and wrappings handy, so the cleaned silver may be promptly put away.

Provide at least a pint of thrice-sifted French whiting,

a bottle of alcohol, two clean brushes—one hard, one soft—jewellers' cotton, absorbent cotton, silk and flannel cloths in plenty, several pieces of wash-leather, and a small bottle of diluted oxalic acid. (See Chapter on Disinfectants.) Have in addition two or three shallow saucers, a small bag of net or gauze, and a bottle of sweet oil.

Begin with the smallest things, such as coffee-spoons and oyster-forks. Look them over for stains; if none are found, dip a flannel in a saucer of whiting, then in alcohol, and rub all the set quickly. Next rub them hard with a clean cloth, either silk or flannel, polish with a leather, and slip into the case. If there are stains, mix whiting well through the saucer of alcohol, cover the stain with the wet stuff, let it dry, then rub off and polish. If the stain is still visible, wet it quickly with oxalic acid, wash off almost instantly, and rub with whiting and alcohol. Wash again after the rubbing, and polish with a leather. Oxalic acid is a poison, so no trace of it must be left. If it takes off the stain, but leaves a dull mark behind, wet a flannel in sweet oil, sprinkle a little dry whiting over it, and rub the dull place hard. Then wipe with a clean cloth wet in alcohol, rub dry, and polish.

Go through the whole tale of spoons, forks, knives, pie, and sugar-shovels, and all sorts of silver tongs. Where there is much ornamental work, cover it with a paste of whiting and alcohol, let it dry on, then rub or brush off, and polish with a flannel and dry whiting, with a touch of leather at the last. Put everything away as it is cleaned, and be sure the numbers correspond with those taken out. When it comes to the big things, go over them one after the other with whiting and alcohol, mixed a little thicker than cream, covering every inch of visible surface, especially under handles and around knobs. Let the whiting dry; then with the stiff brush remove it from the chased work, and with the soft one from plain spaces. After the brushing, rub quickly rather than hard, turning

things round and round, so as to get over the whole surface in a short time. If any whiting sticks in the lines, let it dry a little longer, then brush very hard. Finish by rubbing with the merest suspicion of dry whiting dusted on through the gauze-bag, and removed with a flannel. Rub over smooth surfaces with a leather, but leave the patterns as they stand. This cleaning gives the "butler's finish," so much softer and more desirable than the glaring, staring span-new look.

Cleaning Brass and Iron

To clean brasses quickly and economically, rub them well with vinegar and salt, or oxalic acid and salt; wash immediately after the rubbing, and polish with tripoli and sweet oil. Unless the acid is washed off, the thing will tarnish so quickly, its last estate will be worse than its first. Copper kettles and sauce-pans, brass andirons, fenders, candlesticks, and trays, are best cleaned with vinegar and salt. Cooking vessels in constant use need only to be well washed afterward. Things for show—even pots and pans—need the oil-polishing, which gives a deep rich yellow lustre, good for six months. Oxalic acid and salt is the thing for furniture-brasses; if it touches the wood around it only improves the tone. Wipe the brasses well with a wet cloth, and polish thoroughly with oil and tripoli. Sometimes powdered rotten-stone does better than tripoli. Rub after using either with a dry cloth or leather, until there is no trace of oil. No matter what sort of brass is to be cleaned, it must first be freed completely from grease, caked dirt, and grime. Wash with strong ammonia-suds, rinse, and dry before beginning with the acid and salt.

The best treatment for wrought-iron or wrought-steel, which both have a knack of growing grey, lustreless, and ill-looking, is to first wash it very clean with a stiff brush

and ammonia soap-suds, rinse well, dry—by heat, if possible—then oil plentifully with sweet oil, and dust thickly with powdered quicklime. Let the lime stay on two days, then brush it off with a clean very stiff brush. Polish with a softer brush, and rub with cloths until the lustre comes out. This ought to give the colour of iron in daily use, which is nearly the most beautiful in the whole range of metals. By leaving the lime on, iron and steel may be kept from rust almost indefinitely.

Before wetting any sort of bric-a-brac, and especially bronzes, remove all the dust possible. The less dust water finds about fine lines and crannies, the less it can leave there. After dusting, wash well in strong white soap-suds and ammonia, rinse clean, polish with just a suspicion of oil and rotten-stone, and rub off afterward every trace of the oil. Never let acid touch a bronze surface, unless one wishes to eat and pit it for antique effects.

Mending Things

Broken glass, china, bric-a-brac, and picture-frames, not to name casts, require each a different cement—in fact, several different cements. Glass may be beautifully mended, to look at, but seldom so as to be safely used. For clear glass, the best cement is isinglass dissolved in gin. Put two ounces of isinglass in a clean wide-mouthed bottle, add half-a-pint of gin, and set in the sun until dissolved. Shake well every day, and before using strain through double lawn, squeezing very lightly.

Spread a white cloth over the mending-table, and supply it with plenty of clean linen-rags, strong rubber-bands, and narrow white tape, also a basin of tepid water and a clean soft towel. Wash the broken glass very clean, especially along the break, but take care not to chip it further. Wet both broken edges well with the glue,

using a camel's-hair pencil. Fit the break to a nicety, then slip on rubber-bands lengthwise, crosswise—every way they will hold. If they will not hold true, as upon a stemmed thing, a vase, or jug, or scent-bottle, string half-a-dozen bands of the same size and strength upon a bit of tape, and tie the tape about neck or base before beginning the gluing. After the parts are joined, slip another tape through the same bands, and tie it up above the fracture; thus, with all their strength, the bands pull the break together. The bands can be used thus on casts or china; in fact, to hold together anything mendable. In glass-mending, the greater the pressure the better, if only it stops short of the breaking-point. Properly made, the isinglass cement is as clear as water. When the pieces fit true one on the other, the break should be hardly visible, if the pressure has been great enough to force out the tiny air-bubbles, which otherwise refract the light, and make the line of cleavage distressingly apparent. Mended glass may be used to hold dry things, as rose-leaves, sachet, and violet-powder, even candies and fruits. But it will not bear to have any sort of liquid left standing in it, nor to be washed beyond a quick rinsing in tepid water. In wiping it always use a very soft towel, and pat the vessel dry, with due regard for its infirmities.

Mending Lamps: Mend a lamp loose in the collar with sifted plaster of Paris, mixed to a very soft paste with beaten white of egg. Have everything ready before wetting up the plaster, and work quickly so it may set in place. With several lamps to mend, wet only enough plaster for one at a time. It takes less than five minutes to set, and is utterly worthless if one tries working it over. Metal-work, apart from the glass, needs the soldering-iron. Dust the break well with powdered rosin, tie the parts firmly together, lay the stick of solder above the break, and fetch the iron down on it lightly

but firmly. When the solder cools, remove the melted rosin with a cloth dipped in alcohol.

A Sand-Box: Since breakables have so malicious a knack of fracturing themselves in such fashion they cannot possibly stand upright, one needs a sand-box. It is only a box of handy size with eight inches of clean coarsish sand in the bottom. Along with it there should be some small leaden weights with rings cast in them, running from an ounce to a quarter-pound. Two of each weight are needed. In use, tapes are tied in the rings, and the pair of weights swung outside the edges of the box, so as to press in place the upper part of a broken thing to which the tapes have been fastened.

Set broken platters on edge in the sand-box, with the break up. The sand will hold them firm, and the broken bit can be slapped on. It is the same with plates and saucers. None of these commonly requires weighting. But very fine pieces, where an invisible seam is wanted, should be held firm until partly set, then have the pair of heaviest weights accurately balanced across the broken piece. The weights are also very useful to prop and stay top-heavy things, and balance them so they shall not get out of kilter. A cup broken in half, as is so common with cups, can have the tape passed around it, crossing inside the handle, then be set firmly in the sand, face down, and held by the hanging weights pulling one against the other.

The most durable cement for china is pure white lead, ground in linseed-oil, so thick it will barely spread smoothly with a knife. Given time enough to harden—some three months—it makes a seam practically indestructible. The objection to it is that it always shows in a staring white line. A better cement for fine china is white of egg and plaster. Sift the plaster three times, and tie a generous pinch of it loosely in mosquito-netting. Then beat the egg until it will stick to the platter. Have the broken edges very clean, cover both with the beaten

egg, dust well with the plaster, fit together at once, tie, using rubber-bands if possible, wrap loosely in very soft tissue-paper, and bury head and ears in the sand-box, taking care that the break lies so the weight of the sand will hold it together. Leave in the box twenty-four hours. After a week the superfluous plaster may be gently scraped away.

This answers for white and light-grounded wares. Deep coloured pieces had better be mended with gin and isinglass of double strength. Sometimes a little transparent colour, dissolved in alcohol, may be stirred through the cement with advantage. There are half-a-dozen cements on the market, each of which in competent hands will do fair work, but ware of their mending must be kept out of hot water—advertisements to the contrary notwithstanding.

Here lies the whole art and mystery of successful mending: Have the broken edges clean, be sure all the bits have been saved, know where each of them belongs before beginning work. Very tiny bits and splinters had better be cemented in place a day before the main work begins. If only one has all the pieces, by a little deft pains the most hopeless wreck may be made to look as good as new.

Beside the bowl of water and towel, keep a cup of clear turpentine and another of alcohol on the mending-table, also special rags for wiping the fingers. Never try to work with sticky fingers, nor persist in a mend that is on its face a failure. Better, far better, try all over again. Tepid water will remove any of the plaster cements, and alcohol or turpentine the others. Soak the broken bits until the cement is soft, then wash clean, and begin over.

Set broken casts in the sand-box, mend with egg and plaster mixed, and, when dry, go over the break with plaster and water about as thick as cream. Wash dusty or stained casts well in tepid soap-suds, and whiten them all over with plaster of the same thickness.

Chapter *SEVEN*

Food Values—Digestion—The Balanced Ration

THE food of any individual or family is to a very large extent determined by circumstances. It is unreasonable to suppose, as many popular writers seem to have done, that in some remote age of the past the race lived upon fruits, nuts, and other similar foods exclusively, and that, owing to circumstances which are not set forth, it was diverted from such an existence and adopted the omnivorous habits which have since characterized it. Anthropologists claim, and with good reason, that in the earliest days of the human race man lived without much choice on the food which he could obtain, being fitted by his inheritance from earlier forms of life to use a large variety of foodstuffs. If he happened to be an inhabitant of seacoast regions, shell-fish and other sea food, which could be readily procured, were eaten in quantity. If he lived in inland regions where nuts, wild roots, and seed-bearing grasses were abundant, such foods were used, and

NOTE.—In the preparation of this chapter the following publications of the United States Department of Agriculture have been very freely drawn upon: "How to Select Foods," by Caroline L. Hunt and Helen W. Atwater (1917); "Principles of Nutrition and Nutritive Value of Food," by W. O. Atwater; and "Food Customs and Diet in American Homes," by C. F. Langworthy (1911). Editor.

no one can doubt that in all localities birds and their eggs and such other animal foods as were available were eaten.

In considering the human race as a whole there are three great epochs in man's diet, namely: (1) The early hunting period, in which man depended entirely on a natural supply of both animal and vegetable food; (2) the cooking period, in which man still used a natural supply of food but prepared it for use with the aid of heat; and (3) the so-called cibicultural or food-producing period—that is, the period in which man has depended upon the cultivation of both flocks and herds and field and garden crops, to supplement a wild supply of food.

Civilized man still obtains his fish supply largely as nature provides it from the rivers and other waters, but with this exception—he has come to depend almost wholly on a food supply which is produced through his own efforts directed in the various lines of agriculture.

In the remains of the cave dwellers of prehistoric times are found cracked, charred and broken marrowbones, which show plainly that wild animals were used for food. In the same way in the remains of the prehistoric lake dwellers of Europe are found the grains which made the bread of that remote period. If early man may be judged by the customs of very primitive races, like the Australian aborigines, which have persisted until the present time, insects, seeds, animals, roots, and, indeed, all things which could be eaten, were readily used.

A theory exists that the polar inhabitants are the direct representatives of man of the glacial epoch. If this be true, the food habits of the Eskimo of North America and other polar regions should supply data regarding similar conditions in that prehistoric age. The Eskimo from necessity lives almost exclusively on animal food, the energy-yielding blubber and other fat and the meat protein making up a more or less well-balanced diet.

The Food of the Indians

Of the food habits of the Indians of North America before their customs were modified by contact with white races, much information is available and is of interest as throwing light on the food of a race which may be said to have developed without being influenced by other peoples. The Indians lived not alone by hunting and fishing, but cultivated a number of food plants on an extensive scale. Maize, beans, pumpkins, and sunflowers were the most common food crops, Indian corn being easily first. Wild rice and acorns were eaten, but corn was the chief breadstuff, being eaten boiled and also made into cakes, and the corn dishes of to-day are direct descendants of those prepared by the Indians. All kinds of animals, birds, fish, and shellfish were eaten, and large supplies of such animal foods were smoked and dried for winter use. Nuts and fruits, fresh and dried, and many wild roots and bulbs also constituted important articles of diet. It is interesting to note that special provision was made to secure fat, and that bear fat and other animal fats were collected in quantity, as was oil from the sunflower seed, if the early chroniclers may be credited.

Here is found, with a race isolated from the rest of the world, the same varied diet of animal and vegetable foods which seems to have been universally followed since earliest times.

The food habits of those first Americans and their descendants of the present time have often been described and the amount of information which is available on the subject is large. Of recent publications may be mentioned the extended work of Hrdlicka among the Indians now living in the southwestern United States and northern Mexico. The principal diet of these Indians, it is pointed out, is maize and wheat, though the latter is used less extensively.

Next in importance are meat, fish, fat, and beans, the beans being especially valuable since the meat supply is limited, game being not very abundant and few domestic animals being kept for food. Melons and cactus fruits and other wild fruits and vegetables are used and are often dried for winter use. Such articles make up the diet of these modern Indians.

In the Arctic Regions at the present time as in the past the food is almost exclusively animal, because that is the only sort which is available in quantity. In the Tropics, where vegetable food is abundant and animal foods readily decay, plant products are and always have been of very great importance in the diet. In temperate regions all kinds of food may be secured, and it seems reasonable to suppose that all classes have always been eaten as they are to-day.

In general, the food habits of the human race are an expression of the thousands of years of experience in which man has sought to bring himself into harmony with his environment, and food habits have been determined, as regards materials selected, by available supply, man being by nature omnivorous.

As regards different regions it is found that the available food supply very largely determines the food habits for the family or group, as it was stated earlier that it does for the race. Thus in rural regions in the Southern States beef and mutton, which must be kept with ice after slaughtering, are less common food than poultry, which may be easily raised and kept alive until needed. In the same way corn meal and other corn products, which are readily available, have always been popular foods, as have cowpeas, gumbo, eggplant, sweet potatoes, and the large variety of other southern vegetables which are so palatable. In the cities where cold-storage plants and ice are common a greater variety of food products is possible than in the country, and this fact has a decided bearing upon the diet. Such

facts as these are evident from a study of the results obtained from investigations carried on by the Office of Experiment Stations in Tennessee, Alabama, eastern Virginia, Georgia, and elsewhere in the South.

It is very often easy to trace the influence of environment, as well as food supply, on food habits. Thus in New Mexico the proximity to old Mexico, with its Spanish customs and its peculiar dishes, directly influences food customs as is shown in the preference for frijoles, a small bean of distinctive flavor which is cooked in many ways; and for dishes in which Chili peppers of different sorts are important ingredients. The results of dietary studies in New Mexico and of other observations show that frijoles, corn dishes prepared in the Mexican manner, and similar foods, which may be regarded as peculiar to the region, constitute a large proportion of the total food supply.

Careful observations which have been carried on in American cities and towns in families of foreign birth or parentage make it clear that older persons rather uniformly abide by their previously acquired food habits, while the younger generations are adopting American customs.

How to Select Foods

How can the housekeeper tell whether or not she is providing the food which her family needs and is getting the best possible returns for the money she spends? Unfortunately, the price she pays for food is no test of the nourishment it yields to the body. Tomatoes at five or ten cents apiece in winter do not build body tissues nor furnish fuel for the body engine any better than those at five cents a quart in summer, nor does fancy capon at forty cents a pound nourish the healthy body more generously than fowl at half the price. Appetite is not always a safe guide. A child's appetite might be satisfied with a diet

of nothing but sugar, but this certainly would not be good for him. Neither can hunger and its satisfaction always be relied on. A bulky diet of potatoes or bananas alone would soon make a person feel that he had eaten enough, but would not furnish all that the body needs.

Evidently what a person who plans meals ought to know is what things the body needs in its food and how these needs can be filled by the ordinary food materials. This chapter is intended to give such information. It should make plain that different kinds or classes of foods serve different uses in the body and should help the housekeeper to choose those which will serve all these uses without waste.

The Day's Food

A man who does fairly hard muscular work would be likely to get the food which his body needs if supplied daily with such a combination of foods as the following:

1¼ pounds of bread, having about the same food value as 1 pound of such cereal preparations as wheat or rye flour, oatmeal, cornmeal, rice, etc.

2 ounces, or ¼ cup, of butter, oil, meat drippings, or other fat.

2 ounces, or ¼ cup, of sugar; or ⅓ cup of honey, or sirup, or an equivalent amount of other sweet.

1¼ pounds of food from the following: Fresh fruits and green or root vegetables.

12 ounces of food from a class which may be called "meats and meat substitutes"; that is, moderately fat meats, poultry, fish, eggs, cheese, dried legumes (beans, peas, lentils, cowpeas, and peanuts). Milk also belongs among these foods, but because of the large amount of water it contains, half a glass, or 4 ounces, of it would be required to equal an ounce of any one of the others.

A man who works hard out of doors all day probably would need more food than this, and one who sits all day at his desk would need less. The amounts given are suitable for a man who, like a salesman in a store, walks about more or less and does more or less of such work as lifting.

Everyone knows that the young child takes less food than the older, and that there are variations through adolescence to the period of full vigor and of old age. The numerous food investigations which have been carried on have furnished data for estimating the amounts consumed by children of different ages and by men and women at different periods of life, and general factors have been deduced which are shown in the table below, and which are used in calculating the results of dietary studies to the uniform basis "per man per day."

In this comparison a man in full vigor at moderate work has been selected as the unit for comparison and assigned the value 100. The greater or smaller requirements of men at more severe work, and of women and children, are shown by values greater or less than 100, as the case may be.

Relative values for food requirements of persons of different age and occupation as compared with a man in full vigor at moderate work.

Man, period of full vigor:	
At moderate work	100
At hard work	120
Sedentary occupation	80
Woman, period of full vigor:	
At moderate work	80
At hard work	100
Sedentary occupation	70
Man or woman:	
Old age	90
Extreme old age	70–80
Boy:	
15 to 16 years old	90
13 to 14 years old	80
12 years old	70
10 to 11 years old	60
Girl:	
15 to 16 years old	80
13 to 14 years old	70
10 to 12 years old	60
Child:	
6 to 9 years old	50
2 to 5 years old	40
Child under 2 years old	30

It is evident from the figures quoted that there is an increase in food consumption from infancy until full vigor and that the food requirements again diminish in old age. The figures also show that during early youth and old age, sex does not have a marked effect on food requirements, but from the time growth is complete until old age a woman requires less food than a man engaged in the same kind of work. This difference, which is based on observation of the amounts eaten under average conditions, is explained as being due to the fact that woman's stature is on an average less than man's, and the amount of work, including the internal muscular work of the body, is less, the food requirements being proportional to the size of the body and the quantity of work it performs.

Smaller amounts are eaten when the period of full vigor has passed and in extreme old age, when most of the day is spent in quiet and rest, the quantity of food desired is comparatively small.

Food for a Family

A family consisting of a man and a woman who do moderately hard muscular work and three children—say, between 3 and 12 years of age—would get the food they required if supplied daily with:

4½ pounds of bread, having the same food value as 3 pounds of wheat or rye flour, oatmeal, cornmeal or hominy, or rice; or about 2¾ pounds of cereals and 5 or 6 medium sized potatoes.

¾ cup of fat (butter or butter with oil, beef drippings, or other fat)—a weekly allowance of 2½ to 3 pounds.

A little more than 1 cup of sugar, or a weekly allowance of 4 pounds; or an equivalent amount of some other sweet.

4 pounds in all of fresh fruits and fresh or root vegetables.

One of the two following, the choice depending on the age of the children:

3 quarts of milk and 1 pound of other foods taken from the meat and meat-substitute group.

2 quarts of milk and 1½ pounds of other foods taken from the meat and meat-substitute group.

This rather rough calculation is based on the assumption that cereals contain, on the average, about 12 per cent. protein, 1 per cent. fat, and 75 per cent. carbohydrates, and that 1 pound of bread contains about ⅔ of a pound of cereal; that butter, oil, lard, and other fatty foods average 90 per cent. fat; that fresh fruits and fresh and root vegetables average about ½ per cent. protein and 10 per cent. carbohydrates, with negligible quantities of fat; and that meats, fish, eggs, cheese, etc., as purchased, may be considered to average about 14 per cent. each of protein and fat. The estimate also assumes that all the fat obtained with the meats, etc., is utilized, being either eaten with the meat or saved for use in cookery. Under these conditions the fuel value of the diet would be about 10,000 calories per family per day, or the equivalent amount of 3,000 calories per man per day; the protein value would be about 330 grams per family, or 100 grams per man per day.

Digestion and Assimilation

"We live not upon what we eat, but upon what we digest." Food as we buy it in the market, or even as we eat it, is not usually in condition to be made into body structure or used as body fuel. It must first go through a series of chemical changes by what is called digestion, which prepare it to be absorbed, taken into the blood and lymph, and carried to the parts of the body where it is needed. Digestion takes place in the alimentary canal, partly in the stomach, but more in the intestine. As the result, the useless

portions are separated and rejected, while the parts which can serve for nutriment are changed into forms in which they can be absorbed, taken into the circulation, and utilized.

Digestion

The alterations which the food undergoes in digestion are brought about by substances called ferments, which are secreted by the digestive organs. The saliva in the mouth has the power of changing insoluble starches into soluble sugar, but as the food stays in the mouth only a short time, there is generally little chance for such action. The saliva, however, helps to fit the food to be more easily worked on by the stomach. The gastric juice of the stomach acts upon protein, and the pancreatic juice of the intestine upon protein, fats, and carbohydrates. The action of all the ferments is aided by the fine division of the food by chewing and by the muscular contractions, the so-called peristaltic action, of the stomach and intestine. These latter motions help to mix the digestive juices and their ferments with the food.

The parts of the food which the digestive juices can not dissolve, and which therefore escape digestion, are periodically given off by the intestine. Such solid excreta, or feces, include not only the particles of undigested food, but also the so-called metabolic products, i. e., residues of the digestive juices, bits of the lining of the alimentary canal, etc.

Absorption and Assimilation

The digested food finds its way through the walls of the alimentary canal, and at this time and later it undergoes remarkable chemical changes. When finally the blood, supplied with the nutrients of the digested food and freighted with oxygen from the lungs, is pumped from the heart all

over the body it is ready to furnish the organs and tissues with the materials and energy which they need for their peculiar functions; at the same time it carries away the waste which the exercise of these functions has produced. It is a characteristic of living body tissue that it can choose the necessary materials from the blood and build them into its own structure. How it does this is one of the mysteries of physiology. The body, as we have learned, has also the power of consuming not only the materials of the food, but also parts of its own structure for the production of muscular work, or heat, or to protect more important parts from consumption. How it does this is another mystery, still to be explained.

Ease and Quickness of Digestion

The terms digestible, indigestible, etc., as here used refer simply to the food which is or is not available for the general nourishment of the body after the process of digestion is completed. In common parlance, however, they are used more loosely as referring to the ease and quickness of digestion, and to the general healthfulness of food. One kind of food—bread, for instance—is spoken of as "simple" and "digestible," and another, like fruit cake, as "rich" and "indigestible." There is often much practical truth behind such statements, though little is definitely known concerning the time or labor required to digest different kinds of food.

Food does not ordinarily pass from the stomach into the intestine until it has been reduced to a liquid or semiliquid condition. The length of time required for different foods to leave the stomach has been recently studied by Penzoldt with healthy men. He used a stomach tube for removing the stomach contents for examination. He found that the amount and consistency of food have a marked influence on the rate of digestion in the stomach. Fluids leave the

stomach more rapidly than other materials. From 6 to 7 ounces of water or other common beverages leave the stomach in 1½ hours. Seven ounces of boiled milk leave the stomach in about 2 hours. Hot drinks do not leave the stomach more quickly than cold ones, nor does the quantity have much effect. Solid matter in solution or suspension delayed the passage of fluid from the stomach somewhat. The consistency of solid foods thus seems to have more effect upon digestibility than the amount consumed. The quantity eaten increases the length of time the material remains in the stomach, but not proportionally.

To select a few examples of the time required for foods to leave the stomach: Two eggs (raw, poached, or in the form of an omelet), 7 ounces sweetbreads, 10 moderate sized oysters, 7 ounces white-fish or 3½ ounces of white bread, cauliflowers, or cherries, each left the stomach in from 2 to 3 hours. Eight and one-fourth ounces of chicken, 9 ounces of lean beef, 6 ounces boiled ham, 3½ ounces roast veal or beefsteak, 5⅓ ounces of coarse bread, boiled rice, carrots, spinach, radish, or apple, left the stomach in 3 to 4 hours. Nine ounces of smoked tongue, 3½ ounces smoked beef, 9 ounces roast goose, 5⅓ ounces string beans, or 7 ounces peas porridge, left the stomach in 4 to 5 hours.

Generally speaking, the most readily digested animal foods were materials of soft consistency. White meats—for example, chicken — leave the stomach more quickly than red meats or dark meat—for instance, duck. The method of cooking also exerts a very marked influence on stomach digestion. Fresh fish was found to be more readily digested than meats.

As regards vegetable foods in general, the consistency and the amounts of solid material were again the principal factors affecting the time required for digestion in the stomach. Mealy potatoes for instance, were more easily digested than waxy potatoes, and mashed potato more readily than potato cut up in pieces. Fine bread was more quickly

digested than coarse bread. There was not much difference in the time required for bread crust, bread crumb, toast, new bread, and stale bread to digest in the stomach, provided all were equally well chewed.

It must be remembered that digestion continues in the intestine and that the total time required for the digestion and absorption of the nutrients in any given food material is not shown by such experiments. They find their chief application in prescribing a diet for invalids, as in such cases it is often desirable to require of the stomach only a limited amount of work.

Agreement of Food With Individuals

Digestibility is often confused with another very different thing, namely, the agreeing or disagreeing of food with the person who eats it. During the process of digestion and assimilation the food, as we have seen, undergoes many chemical changes, some of them in the intestines, some in the liver, muscles and other organs. In these changes chemical compounds may be formed which are in one way or another unpleasant and injurious, especially if they are not broken down (as normally they are) before they have opportunity thus to act. Some of the compounds produced from the food in the body may be actually poisonous.

Different persons are differently constituted with respect to the chemical changes which their food undergoes and the effect produced, so that it may be literally true that "one man's meat is another man's poison." Milk is for most people a very wholesome, digestible, and nutritious food but there are persons who are made ill by drinking it, and they should avoid milk. The writer knows a boy who is made seriously ill by eating eggs. A small piece of sweet cake in which eggs have been used will cause him serious trouble. The sickness is nature's evidence that eggs are for him an unfit article of food. Some persons have to

avoid strawberries. Indeed, cases in which the most wholesome kinds of food are hurtful to individual persons are, unfortunately, numerous. Every man must learn from his own experience what food agrees with him and what does not.

How much harm is done by the injurious compounds sometimes formed from ordinary wholesome foods is seldom realized. Physiological chemistry is revealing the fact that these compounds may effect even the brain and nerves, and that some forms of insanity are caused by products formed by the abnormal transformations of food and body material.

In general it may be said that probably most foods used by man are more completely digested than is ordinarily supposed, so that the bulk of the intestinal excretion is made up of metabolic products. Some foods however, contain large proportions of material upon which the digestive juices can not so act as to make them capable of being absorbed. Thus the outer hull of the wheat grain contains woody substance which passes through the alimentary canal of man undigested, though animals, like cows, and sheep can digest a large part of it.

Animal foods seem to have a greater digestibility than vegetable. The digestibility of a given article of food depends, of course, upon the digestibility of the different classes of nutrients and upon the relative proportion in which these nutrients occur. Thus, of two cereals containing about the same amount of dry matter, but with different proportions of protein and carbohydrates, the one with the larger proportion of the less digestible protein and the smaller proportion of the more digestible carbohydrates will be, on the whole, less completely digested.

Sample Meals for a Family

(*Man, Woman and Three Small Children*)

In the combinations of food materials given below, bread and other preparations of cereals are used as freely as they can conveniently be without making the ration one sided or unattractive. Such cereal foods form a very wholesome and economical basis for the diet, whether the cereal is used as a breakfast dish, as flour or meal in bread and cakes, or in other ways. A diet equally nourishing and wholesome might be planned with less cereal, but this would make it necessary to increase the amount of the more costly foods, such as meat, fruits, vegetables, and sweets. When cereals are used freely it is most important that they be made as attractive as possible. This means good bread, well-cooked and carefully salted breakfast cereals, and inexpensive but well-made and seasoned cakes and puddings. Rice, macaroni, and hominy can often be made more appetizing and nutritious by combining with them small amounts of materials which are not so cheap and have more distinctive flavors. Among these are meat and cheese, and onion, tomato, and other seasoning vegetables. Examples of such combinations are rice and meat, meat pie, or meat with dumplings; macaroni and cheese; tomatoes cooked with bread crumbs or rice; and cereal and fruit puddings, or cereal and milk puddings.

Food materials like these may be combined into three meals in many ways. The following meals are given, not because they are recommended above many others that might be used, but simply to show that such foods can be combined into dishes such as are commonly used in American homes.

Breakfast

Fruit, 1¼ pounds of fresh fruit (equivalent to 3 medium sized oranges, 5 small apples, or a quart-box of straw-

berries), or 3 or 4 ounces of dried fruits (equivalent to 10 or 12 dates or 4 or 5 figs).

Cereal breakfast food, 4 ounces before being cooked, or about 1½ pints after it is cooked. The equivalent in food value in puffed or flaked, ready-to-eat cereals would be 5 or 6 cups.

Milk on cereal, ¼ cup for each person.

Sugar on fruit, on cereal, or in coffee, 2½ level tablespoons or 1¼ ounces.

Bread, 8 slices or 8 ounces.

Butter, 1¼ ounces, or 2½ cubic inches.

An egg or 2 ounces of meat, fish, or poultry for each older person, and a glass of milk for each young child.

Dinner

Meat, or fish, ¼ pound per grown person; or, for each child, an egg or a glass of milk.

Potatoes (5 medium-sized), 1¼ pounds.

Another vegetable (turnips, spinach, corn, cauliflower, or other), 1 pound.

Bread, 8 slices, or 8 ounces.

Butter, 1¼ ounces, or 2½ cubic inches.

Steamed apple (or other fruit) pudding. (Ingredients: Two cups flour, 2 tablespoons butter, ¾ cup milk, 4 apples, 1 tablespoon sugar.)

Sauce. (Ingredients: One-half cup sugar, 1½ tablespoons flour, 2 teaspoons butter, ¼ cup water, flavoring.)

Supper

A gravy made out of 1 pint of skim milk, ¼ cup flour, 2 level teaspoons butter, and 4 ounces salt or smoked fish (just enough for flavor). To this can be added the egg yolk left from the frosting of the cake. (See below.)

Rice 8 ounces, or 1 cup, measured before being cooked.

Bread, 8 slices, or 8 ounces.

Butter, 1¼ ounces, or 2½ cubic inches.
One-half of a cake. (Ingredients for whole cake: One-fourth cup butter, ½ cup sugar, 1 egg, ½ cup milk, 1½ cups flour, 2½ teaspoons baking powder.)
Frosting made with 1 egg white and ¼ cup sugar.

What the Day's Food Should Provide

The above meals would supply the following substances in about the right proportions to keep the family in healthful condition and to make the food taste good, providing they were well prepared.

A. *Mineral substances* of great variety (lime salts, compounds of phosphorus, iron, and others).—These are used by the body for building material and are found in all parts of it. They also produce substances within the body tissues which tend to offset acid substances produced in the tissues in the course of digestion of meats and cereals and serve many other important uses. Without fruits and vegetables the meals would be likely to lack certain mineral substances. Without milk they would be lacking in a mineral substance specially needed by children; that is, lime.

B. *Protein.*—Protein serves as fuel for the body and also provides a certain important element, nitrogen, which is needed in the case of children for growth and in the case of both children and grown people to keep the body in repair. Without the meat or meat substitutes (including milk) the meals would be lacking in this body-building material.

C. *Starch.*—This is one of the chief fuels of the body and is supplied mainly by the cereal foods.

D. *Sugar.*—This serves as fuel for the body and to flavor the food. It is found in milk, fresh fruits, and many other materials, but unless small amounts of very sweet materials—sugar itself, sirup, or honey—are used, the diet is likely to be lacking in it.

E. *Fat.*—This serves as body fuel and also improves the flavor and texture of the food. It is present in meats, nuts, and many other foods, but unless small amounts of specially fat materials, like butter, oil, or cream, are used the meals are likely to be lacking in it. Moreover, dishes cooked without a certain amount of fat and meals served without butter or some substitute seem, to most persons, dry and unpalatable.

F. *Cellulose.*—This is the material which makes up the framework of plants. It gives bulk to the diet and may tend to prevent constipation. Without the fruits and vegetables the meals would be lacking in this important element.

G. *Certain newly discovered substances in very small amounts*, which are believed to play an important part in keeping people well and in promoting the growth of children. Without milk in the diet some of these substances, particularly those necessary for children, would be lacking, and without meat, milk, eggs, fruits, and vegetables others needed by persons of all ages might not be present in sufficient amounts.

H. *Flavorings and condiments.*—In most families some materials are used in preparing or serving food which add to the attractiveness of the meals without furnishing the body any nourishment. Among these are salt, pepper, vinegar, lemon juice, spices, seasoning herbs, horse-radish, flavoring extracts, and many other materials often spoken of as "condiments." These are not discussed at length, because they are not absolutely needed by the body. They may, however, be very useful in making an otherwise unattractive diet taste good. In fact, the secret of making inexpensive meals attractive lies largely in the skillful use of seasoning and flavors, and in this way they may well be worth the cost they add to the diet even if they do not increase its actual food value.

Any kind of food contains one or more of the substances

just described, and they are combined in as many different ways as there are kinds of food. A satisfactory diet contains all of them and each in its proper proportion, and the problem of planning meals is really that of choosing foods which will do this.

Grouping Foods to Show Their Uses

Perhaps as easy a way as any to select the right foods is to group the different kinds according to their uses in the body and then to make sure that all the groups are represented regularly in the meals. Fortunately no more than five groups need be considered: (1) Fruits and vegetables; (2) meats and other protein-rich foods; (3) cereals and other starchy foods; (4) sweets; and (5) fatty foods. The materials under each of these heads have their special uses. It will be helpful, therefore, for the housekeeper to form the habit of thinking of the many different kinds of food which she handles as grouped in some such way as the following:

Group 1.—Fruits and vegetables, such as apples, bananas, berries, citrus fruits, spinach, and other greens, turnips, tomatoes, melons, cabbage, green beans, green peas, green corn, and many other vegetables and fruits. Without these the food would be lacking in mineral substances needed for building the body and keeping it in good working condition; in acids which give flavor, prevent constipation, and serve other useful purposes; and in minute quantities of other substances needed for health. By giving bulk to the diet they make it more satisfying to the appetite.

Group 2.—Meat and meat substitutes, or protein-rich foods: Moderately fat meats, milk, poultry, fish, cheese, eggs, dried legumes (beans, peas, lentils, cowpeas, peanuts), and some of the nuts. These are sources of an important body-building material, protein. In the case of children, part of the protein food should always be whole milk.

Group 3.—Foods rich in starch: Cereals (wheat, rice, rye, barley, oats, and corn) and potatoes (white and sweet). Cereals come near to being complete foods, and in most diets they supply more of the nourishment than any other kind of food. It is not safe, however, to live only on cereals. The grains may be simply cleaned and partially husked before cooking, as in cracked wheat and Scotch oatmeal; they may be ground into flour and used as the basis of breads, cakes, pastry, etc.; or they may be partially cooked at the factory, as in many breakfast preparations; or they may be prepared in the form of such pastes as macaroni, noodles, etc. In all these forms they furnish the body with the same general materials, though in different proportions.

Group 4.—Sugar (granulated, pulverized, brown, and maple), honey, molasses, sirup, and other sweets. Unless some of the fuel is in this form the diet is likely to be lacking in flavor.

Group 5.—Foods very rich in fat: Bacon, salt pork, butter, oil, suet, lard, cream, etc. These are important sources of body fuel. Without a little of them the food would not be rich enough to taste good.

Some food materials really belong in more than one group. Cereals, for example, supply protein as well as starch; potatoes supply starch as well as the mineral matters, acids, cellulose, and body-regulating substances, for which they are especially valuable; and most meat supplies fat as well as protein. For the sake of simplicity, however, each material is here grouped according to the nutrient for which it is usually considered most valuable.

The lists given below show some of the common food materials arranged in these five groups. If the housekeeper will consult them in planning meals until she has learned where each kind of food belongs, she will have taken the first step toward providing a diet which will supply all the food needs of her family. It will be only one step, to be sure, but it should prevent two mistakes—that of serving

meals that have not sufficient variety, and that of cutting down in the wrong places when economy either of time or money is needed:

GROUP 1.—*Foods depended on for mineral matters, vegetable acids, and body-regulating substances.*

Fruits:
- Apples, pears, etc.
- Bananas.
- Berries.
- Melons.
- Oranges, lemons, etc.
- Etc.

Vegetables:
- Salads—lettuce, celery, etc.
- Potherbs or "greens."
- Potatoes and root vegetables.
- Green peas, beans, etc.
- Tomatoes, squash, etc.
- Etc.

GROUP 2.—*Foods depended on for protein.*

- Milk, skim milk, cheese, etc.
- Eggs.
- Meat.
- Poultry.
- Fish.
- Dried peas, beans, cowpeas, etc.
- Nuts.

GROUP 3.—*Foods depended on for starch.*

- Cereal grains, meals, flours, etc.
- Cereal breakfast foods.
- Bread.
- Crackers.
- Macaroni and other pastes.
- Cakes, cookies, starchy puddings, etc.
- Potatoes and other starchy vegetables.

GROUP 4.—*Foods depended on for sugar.*

- Sugar.
- Molasses.
- Sirups.
- Honey.
- Candies.
- Fruits preserved in sugar, jellies, and dried fruits.
- Sweet cakes and desserts.

GROUP 5.—*Foods depended on for fat.*

- Butter and cream.
- Lard, suet, and other cooking fats.
- Salt pork and bacon.
- Table and salad oils.

Thinking of foods according to the group to which they belong, or according to the nutrient which they supply in largest amount, will help the housekeeper to see whether in the meals she plans she has supplied all the different materials needed, especially whether there is the necessary, though small, amount of tissue-building mineral matters and body-regulating materials (group 1), and of tissue-building protein (group 2). When she has made sure that these are present, she may safely build up the bulk of the diet from such materials from the other groups as seem economical, wholesome, and appetizing. By means of this grouping she will be reminded that meals consisting only of cereal mush (group 3), served with butter (group 5), and sirup (group 4) would not be a complete ration, and would almost surely be lacking in body-building material, because there are no foods from either group 1 (fruits and vegetables) or group 2 (protein rich). It will become clear, also, that a school lunch of a kind far too frequently served, consisting of bread and cake, is lacking in the same way, and that a glass of milk (group 2) and an apple or an orange (group 1) would make it far more nearly complete. She will learn the wisdom of serving fruit (group 1) rather than a whipped-cream dessert (group 5) or a suet pudding (groups 3 and 5) after a course including a generous portion of fat meat (groups 2 and 5).

The grouping will also help the housekeeper who wishes to save money or time to simplify her meals without making them one-sided or incomplete. For example, if she has been serving bread, potatoes, and rice or hominy in one meal, she will see that one or even two of them may be left out without omitting any important nutrient, providing a reasonable quantity of the one or two remaining is eaten. It will show her that a custard which is made of milk and eggs, two foods from group 2, would hardly be needed after a meal in which a liberal supply of meat had been served, provided one ate heartily of all, and that a child does not need milk at the

same meal with an egg or meat. It will suggest that baked beans or other legumes, or thick soups made of legumes, are substitutes for meat rather than foods to be eaten with meat.

This method of planning prevents substituting one food for another which has an entirely different use. It prevents the housekeeper, for example, from trying to give a pleasant variety by using an extra amount of cakes or sweet desserts in the place of fruit and vegetables when the latter seem difficult to obtain. Sugar is nutritious and has a valuable place in the diet, but the nourishment it furnishes is fuel and not the body-building and body-regulating materials which are found in fruits and vegetables, and it is not safe to cut them out, even if the meals can be made attractive without them. Fortunately, they are not always so hard to obtain as it seems, and the wise housekeeper will make every effort to supply them. In general, economy within each group is safer than using an inexpensive food from one group in place of an expensive one from another group.

Thinking in terms of these groups will also help when laying in supplies. Dried peas and beans and dried fish, canned fish and meat, and some kinds of cheese keep for a long time and can be used in place of fresh meat in an emergency. Fruits and vegetables put up when they are abundant will help to supply this important group in winter.

Farm women can look even farther ahead, and often can plan to raise a variety of foods for use when it is difficult to buy at reasonable prices; for example, enough beans to give the family a generous supply. Though navy beans have been most largely used in this country, there are many other good and easily grown kinds that can be chosen to give variety. In the South, cowpeas should not be overlooked. If sugar is high in price honey can be produced, and home made or purchased sorghum, maple, or cane sirup can be used.

How Much Food?

It is very hard for a housekeeper to know exactly how much of each of the food substances or nutrients her family needs or exactly how much of each she is giving them. The exact amount which each person needs depends upon age, sex, size, and amount of work done with the muscles. An elderly person, or one of quiet habits, needs less food than a vigorous, young one; a large person more than a small one; a man more than a woman; grown persons more than children; and a farmer working in the hayfield, a mechanic, or a football player more than a man who sits at his desk all day.

In order to calculate exactly how much starch, sugar, fat, protein, etc. (or, what is equivalent to this, how much protein and energy), the family needs one would have to know exactly how much muscular work each member was performing and also exactly how much of the different nutrients each food contained and exactly how much each person would eat. This, of course, would mean a great deal of figuring. Fortunately, such exactness is not necessary in ordinary life. If a little too much or too little of one nutrient is provided at a single meal or on a single day a healthy body does not suffer, because it has ways of storing such a surplus and of using its stored material in an emergency. The danger would come if the diet taken week in and week out always provided too much or too little of some one nutrient. Against this danger the housekeeper can easily protect her family.

Habit and custom help greatly, because they usually are based on what the experience of generations has proved is wise and healthful, though, of course, there are bad habits and outgrown customs in food as in everything else. Good food habits, it must be remembered, include more than cleanliness and order in everything that has to do with food and meals and leisurely ways of eating. Equally

important are a liking for all kinds of wholesome foods, even if they have not always been used in one's home or neighborhood, and eating reasonable amounts, without being either greedy or over-dainty. Every effort should be made to train children in such good food habits. If older people have not learned them, they, too, should try to do so, for such things are very important not only to health but also to economy. To refuse to eat some wholesome dish simply because one is not accustomed to it may prevent the use of some very desirable and economical food. To feel that there is any virtue in providing more food than is needed shows poor taste as well as poor economy.

The health and appearance of the family are a good test of the wholesomeness of their diet. If they are strong, well developed for their ages, free from ailments, and full of energy and ambition, one may safely say their food agrees with them. But if they are listless and ailing, or not as well developed either physically or mentally as they should be, and if a competent physician finds that there is no special disease to account for these bad symptoms, a mother may well ask herself if the food is right, and if not, how she can make it so.

Hints for the Provider

It is believed that it is impossible to plan the meals for a family wisely without some knowledge of how different kinds of food serve the body, and that the safest short cut to good planning lies in considering foods in the five groups here described. A few general suggestions for getting the most for one's money in the matter of food may be made here.

Use cereals (flour, meal, cereal breakfast foods, etc.) freely, taking pains to prepare them with great care and to vary the kind used from day to day if necessary to keep people from tiring of them.

Remember that a quart of whole milk a day for each child, to be used as a beverage and in cookery, is not too much.

Remember that while skim milk should never be substituted for whole milk as the principal food in a child's diet, it is as valuable as whole milk as a source of protein and mineral matters in the general diet.

Remember that, except in the case of milk for children, the amount needed of foods specially useful for body-building purposes—that is, meats and meat substitutes, fruits, and vegetables—is not large, but what is needed is needed very much.

Do not be ashamed to plan closely. Thrift in food means providing enough food, neither too little nor too much.

Notice carefully how much of such staples as flour, sugar, milk, cooking fat, etc., is used each week for a month, and see if there are any ways of cutting down the quantity consumed.

Buy non-perishable materials in quantities if better prices can be secured and there is a good storage place in the home. Neighbors can sometimes club together to get lower rates.

Try to make the dishes served of such size that there will be enough to satisfy the appetite of the family, and no unnecessary table and plate waste.

Do not be above noticing whether anything usable is thrown away with the garbage, which always shows how thriftily food is used in a household.

Many inexpensive materials can be made attractive and the diet can be pleasantly varied by a wise use of different flavorings.

"Finicky" tastes in food often prevent the use of many valuable materials which might be the means of saving money.

Good food habits are an important part of personal hygiene and thrift. Children get such habits by having

suitable amounts of suitable foods served to them and then being expected to eat what is set before them.

True economy lies not only in buying wisely, but also in making the fullest possible use of what is bought.

Chapter *EIGHT*

War Time Foods and Recipes

VARIOUS reasons have been advanced for the high cost of living, among them being the amount of food that we ship to Europe and the shortage in certain crops.

As we shall probably have to continue for some time to send much food to Europe, we must, each and every one of us, do everything we can to economize and save the waste in order to avoid a shortage among our own people and keep down the cost of food as much as possible.

Every housewife can "do her bit" towards solving the food problem by simplifying the meals she serves and by seeing to it that not one bit of food is wasted.

If every housewife will carefully read, study, and put into everyday use *at once*, the suggestions made in the following pages, she will not only be helping to reduce the high cost of living for her family and her neighbors, but will be rendering a distinct patriotic service.

NOTE.—The Editor desires to acknowledge his obligations to "Hints to Housewives" (issued by Mayor Mitchel's Food Supply Committee, in June, 1917) and numerous recent publications of the United States Department of Agriculture which have been very fully quoted in this chapter.

Use of Fats and Drippings

The average American housewife has no conception of the value of fats as food, and as a result much fat is wasted that should be used as food.

Fats are one of the principal sources of energy. We buy fat in the form of butter and spread it on our bread. We use lard as shortening in bread and pastry and as a medium in which to fry other foods. The grease which melts out of ham and bacon is sometimes made into gravies; but more often it is thrown away, because the housewife does not realize its value as a food. Beef fat is less appreciated as a food even than lard, and yet pound for pound it is as valuable as butter or lard or any other animal fat.

When we buy a beefsteak the butcher carefully trims off the fat and throws it into a box under the counter with bones and other waste which goes to the soapmaker. This fat has both a food value and a money value. It belongs to you and you should have it. You can render it and use it in cooking.

The fine lumps of sweet beef fat or suet which adhere to the roast are used in roasting to give flavor, but most of the fat melts away and is not served at the table. Beef suet is occasionally used in cooking, but rendered beef fat is rarely used as a table fat in this country, although in Europe it is often eaten on bread in the place of butter. Beef suet has a rather pronounced flavor and a comparatively high melting point. These are probably the reasons why it is not more commonly used as a table fat. Much of the objectionable taste may be readily removed. One household method which may successfully be followed is to mix milk with the suet when it is rendered, using one-half cupful of milk to a pound of suet. When strained and cooled the flavor of the milk is absorbed by the beef fat and changes the characteristic flavor.

We must not longer allow beef fat to be sold for soap stock. To-day butter is about fifty cents a pound and lard about thirty cents. Beef fat, which pound for pound, is as valuable as either lard or butter, is fifteen cents a pound in most markets. Indeed in some places butchers sell it for less than that.

If housewives would use beef fat instead of butter in every process of cooking in which they could possibly introduce it, their families would get the fat they need at one-third the cost of butter.

Get into the habit of using beef drippings as food. Every pound of beef drippings you save takes the place of a pound of expensive butter.

Drippings

As a substitute for butter in cooking certain foods, and also in seasoning vegetables there is nothing better than sweet, savory drippings. The following fats make savory drippings and can be employed alone or in combination. The fat from fried sausages, ham, bacon and pork and from roast pork, veal and chicken. The fat skimmed from the water in which poultry has been boiled and the fats skimmed from the gravies of most roast meats should be clarified and saved. Great care must be taken that all these fats are clean and sweet, and that the temperature at which they are tried out shall not be so high as to impair the flavor. Burned or scorched fat is not only unpleasant in flavor, but is a frequent cause of indigestion.

Not all meats supply fats that are savory in the sense in which the word is employed here. Most people do not use the fat from mutton, lamb, duck, goose and turkey because of their flavor; but these fats can be used just as well as any other fat if you do not object to their flavor, or if they are combined with a larger quantity of other fats.

To Prepare Fat for Frying. Fats are "tried out" or rendered, to free them from connective tissue, then clarified

to remove water and impurities. Suet and scraps must first be tried out, and then clarified; soup fat and drippings need only to be clarified.

To Try Out Fat. Cut the fat into bits, put it into a frying-pan, or better, a double boiler, and let it cook slowly for several hours. When the fat is melted and nearly free from water, strain it, pressing to obtain all the fat.

To Clarify Fat. Melt drippings or tried-out fat, add to it a few slices of raw potato, and heat slowly in the oven until it ceases to bubble. The potato absorbs some of the impurities; most of the rest settle to the bottom. Strain the fat through cheese-cloth, and let it stand undisturbed till solid. If stirred, it absorbs moisture from the air. Since it keeps longer if left unbroken, it is well to strain it into cups or any small jars you may have on hand, so that a portion may be used without disturbing the rest.

When rendering the trimmings of fat meat, add a small onion (do not cut it), a teaspoon of salt, and a little pepper. This seasoning is enough for half a pint of fat.

Keep the drippings covered and in a cool, dry place.

Substitutes for Butter

There are many substitutes for butter on the market such as oleomargarine and nut margarine. Such butter substitutes can frequently be used to advantage in place of butter. As they cost about one-half the price of butter you can effect a decided saving by using them.

An excellent substitute for butter can be made in the following manner: Put ½ teaspoon of powdered gelatine in a bowl and dissolve it in 1 tablespoon of water. Then add ½ cup of moderately hot milk (the top of the bottle is best) and ¼ lb. of oleomargarine. Beat the mixture until it is creamy, and then put in the ice-box to cool. This makes a splendid butter for table use.

As oleomargarine costs only one-half as much as butter

and as we get ½ lb. of butter substitute by using only ¼ lb. of oleomargarine, we really get ½ lb. of butter substitute for ¼ the price of butter by using the above recipe.

Substitutes for Meat

We eat in order to keep ourselves alive.

The work we do, the exercise we take, the thoughts we think, each breath we draw—all these use up a certain proportion of our body each day. If we want to live and keep well, this used-up portion must be replaced, and this is done through the food we eat. Part of our food furnishes us with new blood; part of it goes to make bone; part of it builds up new tissue or flesh, etc.

Meat has always been considered the best tissue or flesh-building food, and for this reason people have always eaten it a great deal. Most of our meat has come from the Western states, but the tremendously large ranches of twenty years ago are gradually being cut up into small farms, and cattle are not being raised in such large numbers any more. This is one reason why meat costs so much. Another reason is the great demand there is for it on the part of our people who do not know that there are other foods that will supply the needs of the body in just the same way that meat does and which in ordinary times do not cost as much as meat. For instance, we can use fish in place of meat much more than we do. Other foods that can be used in place of meat are eggs, milk, creamed soups, macaroni, cheese, cereals, peas, beans, lentils, nuts and bananas.

Eggs contain all the elements, in the right proportion, necessary for the support of the body. They are rich in the same flesh-building elements as the lean of meat, and, therefore, make an excellent substitute for meat. They should be eaten with foods that are rich in starch,

such as bread and potatoes. If so eaten, they will take care of your body just as completely as meat would.

Milk contains heat-giving, energy-giving and tissue-building properties. Cream soups and purées made with milk and the pulp of vegetables can take the place of meat.

Macaroni, Spaghetti and Noodles contain so much starch and flesh-building material that they are equal to meat as a food if combined with cheese. The fat that they lack is supplied by the cheese, and when so combined they make a perfect food.

Cheese contains in a condensed form the same flesh-building material as meat and can be used in place of it. If combined with macaroni, rice, etc., it will supply all the needs of the body.

Cereals contain in varying proportion all the elements necessary to support life. They contain a great deal of starch, which is valuable as an energy giver. Oatmeal and cornmeal contain more fat than other cereals, and, therefore, make a good winter food, especially for hard-working people. Cereals with cooked fruits are particularly appetizing.

Peas, Beans and Lentils are richer in flesh-building material than any other vegetable and can be used in place of meat. Lentils are more easily digested than either peas or beans. If properly prepared, all these make very appetizing dishes. A dish of baked beans, costing about 20 cents, will furnish a family of six with more nourishment than two pounds of beef costing 50 cents.

Nuts contain in a condensed form the same flesh-building material as meat. Some of them contain a great deal of fat as well. They should not be eaten between meals, but, either raw or cooked, they can be used in place of meat. A pound of shelled almonds is equal in food value to three pounds of steak. Hickory-nuts and pecans added to muffins or yeast breads may be used as a substitute for

meat. Peanuts are also rich in fat and flesh-building material.

Bananas contain most of the nourishment that meat does, and if eaten with bread and butter, make an excellent lunch without the addition of meat. Most children prefer banana sandwiches to meat sandwiches, and they cost much less.

In stating that these dishes can be used in place of meat it is not our purpose to urge that meat be given up altogether. It is a fact, however, that as a people we eat too much meat, and we would undoubtedly find ourselves much benefited physically if we would cut down on the amount of meat we eat and vary our diet more than we do.

We do not have to eat meat in order to keep well and strong. A great many people never eat meat at all, but find in other foods all the strength and life-giving properties they require.

If our meat supply continues to dwindle in the future as it has in the past, meat will some day be very scarce, and sooner or later we shall have to learn to use other foods in place of meat.

Recipes for Meat Substitutes

Eggs

Eggs with Cheese

4 eggs
½ cup milk
1 tablespoon butter or drippings
Pepper
Salt
Cayenne
2 tablespoons grated cheese

Heat a small omelet pan, put in butter or drippings, and, when melted, add milk. Slip in the eggs one at a time; sprinkle with salt, pepper and a few grains of cayenne. When whites are nearly firm sprinkle with cheese. Finish

cooking, and serve on buttered toast. Pour sauce from the pan over the eggs.

Scrambled Eggs with Tomatoes

4 eggs
½ cup stewed and strained tomatoes or canned tomato pulp
½ teaspoon salt
¼ teaspoon paprika
2 tablespoons butter or drippings

Beat eggs slightly and add tomatoes, salt and paprika. Melt butter or drippings in a frying-pan, add seasoned eggs, and cook same as scrambled eggs. Butter slices of toasted bread. Pour eggs over the toast and sprinkle with parsley.

Eggs Baked in Tomatoes.—Eggs may be baked in small tomatoes. Cut a slice from stem end of tomato, scoop out the pulp, slip in an egg, sprinkle with salt and pepper, cover with buttered crumbs and bake.

Poached Eggs with Cheese.—Arrange poached eggs on a shallow buttered dish. Sprinkle with grated cheese. Pour over eggs one pint white sauce. Cover with stale bread crumbs and sprinkle with grated cheese. Brown in oven. Tomato sauce may be used instead of white sauce.

Cheese Omelet.

2 eggs
1 tablespoon melted butter or drippings
½ teaspoon salt
Few grains cayenne
1 tablespoon grated cheese

Beat eggs slightly; add one-half teaspoonful of melted butter or drippings, salt, cayenne and cheese. Melt remaining butter or drippings in frying-pan, add mixture and cook until firm without stirring. Roll and sprinkle with grated cheese.

Bread Omelet.

3 eggs
¼ teaspoon salt
1 dash of black pepper
½ cup of bread crumbs
½ cup of milk
Piece of butter or butter substitute, size of walnut

Beat the eggs separately. Add to the yolks the milk, salt, pepper and the bread crumbs. Now stir into this carefully the beaten whites; mix very lightly. Put the butter or butter substitute in a very smooth frying-pan; as soon as hot turn in the mixture gently, and set it over a clear fire, being very careful not to burn; shake occasionally to see that the omelet does not stick. Now stand your frying-pan in the oven for a moment to set the middle of the omelet. When done, toss it over on a warm platter to bring the brown side of the omelet uppermost; or, it may be folded in half and then turned out in the center of the platter. Serve immediately or it will fall.

Creamed Cheese and Eggs.

3 hard boiled eggs — 1 tablespoon flour
½ teaspoon salt — Few grains cayenne
4 slices toast — 1 cup milk
¼ cup grated cheese

Make a thin white sauce with flour, milk and seasoning. Add cheese, stir till melted. Chop egg whites and add to sauce. Pour over toast. Force yolks through a strainer. Sprinkle over the toast.

Soups

Soup is thought to be an expensive luxury by some people, but it is really a means of economy; for a tempting and nutritious soup can be made of the cheapest materials, including remnants of food that cannot be used in any other way.

Barley is very nourishing and can be used instead of flour to thicken any soup. Directions: Wash barley and soak overnight. Next day add water to the barley and boil it for three or four hours. Then press it through a sieve and add it to the soup. This thickening can be used in any cream soup in place of flour.

Cream of Potato Soup.

1 qt. milk or milk and water
1½ cups potatoes mashed
2 tablespoons butter or butter substitute
1½ tablespoons flour
1 teaspoon salt
Few grains pepper
1 sliced onion
1 bay leaf

Put the onion and bay leaf into the milk and heat to the scalding point. Remove the onion and bay leaf and add the mashed potatoes. Stir until smooth; then add the flour and butter or butter substitute rubbed together. Cook until it thickens slightly. Add seasoning and sprinkle over with finely chopped parsley.

Cream of Pea Soup.

1 can peas
2 teaspoons sugar
1 pint water
1 pint milk
1 slice onion
2 tablespoons butter or drippings
2 tablespoons flour
1 teaspoon salt
⅛ teaspoon pepper

Drain peas from their liquor, add sugar and cold water and simmer twenty minutes. Rub through a sieve, reheat and thicken with butter or drippings and flour cooked together. Scald milk with onion, remove onion and add milk to pea mixture. Left-over peas can be used in place of canned peas.

Cream of Tomato Soup.

Small can of tomatoes or canned tomato pulp
2 tablespoons butter or drippings
2 tablespoons flour
1 quart milk
1 slice onion
1 slice green pepper
Salt and pepper to taste
Few grains cayenne
¼ teaspoon of bicarbonate of soda

Put tomatoes, onion and green pepper into a saucepan and cook slowly for about ten minutes; then put through a strainer. Rub flour and butter or drippings together until smooth. Add this to the milk and stir over moderate fire

until it thickens slightly. Add soda to the tomato juice and pour the milk into the tomato juice. Do not combine tomato and milk until ready to serve.

Cream of Cauliflower Soup.

- 4 cups hot stock or water
- 1 cauliflower
- 2 tablespoons butter or drippings
- 1 slice onion
- 1 stalk celery cut in inch pieces, or ½ teaspoon celery salt
- ½ bay leaf
- ¼ cup flour
- 2 cups milk
- Salt
- Pepper

Soak cauliflower, head down, one hour in enough cold water to cover; cook in boiling salted water twenty minutes. Reserve one-half flowerets, and rub remaining cauliflower through sieve. Cook onion, celery, and bay leaf in butter or drippings five minutes. Remove bay leaf, then add flour and stir into hot stock or water; add cauliflower and milk. Season with salt and pepper; then strain, add flowerets, and reheat.

Cream of Carrot Soup.

- Carrots
- 2 slices onion
- Sprig parsley
- ¼ cup rice
- 2 tablespoons butter or drippings
- 1½ teaspoons salt
- Few grains cayenne
- 2 cups water
- 2 cups scalded milk
- 2 tablespoons flour

Chop enough carrots to make two cups. Cook in water until tender. Press through sieve, keeping the water the carrots were cooked in. Cook rice in milk in double boiler. Cook onion in butter or drippings; add flour and seasonings. Mix carrots with rice and milk, and add butter or drippings, flour and the water the carrots were cooked in; bring to the boiling point, strain and serve. Garnish with chopped parsley. If this soup seems too thick, thin with milk.

Cream of Cabbage Soup.

1 small cabbage
2 cups water
2 cups milk
3 slices onion
2 tablespoons flour
2 tablespoons butter or drippings
1 teaspoon salt
⅛ teaspoon pepper
Few grains cayenne

Chop cabbage, add water, and cook until tender; press through a sieve. Melt butter or drippings, add chopped onion, cook slowly five minutes, add flour, scalded milk and cabbage mixture; cook five minutes. Add seasonings, strain and serve.

Cream of Rice Soup.

1 cup rice
6 cups cold water
1 small onion
1 teaspoon chopped parsley
1 cup milk
2 tablespoons butter or drippings
2 tablespoons flour
Salt and pepper

Cook rice and onion in cold water until rice is tender. Press through a sieve. Melt butter or drippings, add flour, milk, and seasonings; boil five minutes. Combine mixtures. Add parsley and serve. (The parsley can be left out if not wanted.)

Cream of Asparagus; Cream of Green Peas; Cream of String Beans; Cream of Spinach; Cream of Corn; Cream of Celery.—These soups are very delicate, and are much esteemed. They are all made in the same way. The vegetable is boiled until soft, and is then pressed through a sieve. A pint of the vegetable pulp is diluted with a quart of stock or water (the stock may be veal, beef or chicken broth). It is thickened with one tablespoon of butter or drippings, and two tablespoons of flour rubbed together until smooth, and seasoned with pepper and salt. Remove from the stove and add one cup of milk; then strain again, so it will be perfectly smooth.

Potato Chowder.

6 good-sized potatoes
¼ lb. salt pork
1 onion
1 tablespoon butter or drippings
1 tablespoon flour
1 pint milk
1 tablespoon chopped parsley
1 teaspoon salt
½ teaspoon pepper

Cut the potatoes into dice; then cut the pork into small pieces, and put the pork with the sliced onion into a frying-pan, and fry until a light brown.

Put into a kettle a layer of potatoes, then a layer of onions and pork, and sprinkle with salt, pepper, and chopped parsley. Repeat this until all the potatoes, pork, onions, and parsley are in. Pour over them the grease from the pan in which the pork and onions were fried. Add one pint of water, cover, and let simmer twenty minutes. Scald the milk in a double boiler, and add the flour and butter or drippings, rubbed together until smooth. Add this to the pot when the potatoes are tender, and stir carefully together, so as not to break the potatoes. Taste to see if the seasoning is right. Serve very hot.

Corn Chowder

1 can corn
1 cup salt pork cut in cubes
1 cup potatoes
½ cup onion
Salt and pepper
3 cups water
2 cups milk
1 tablespoon butter or drippings
1 tablespoon flour
½ cup cracker crumbs

Cook salt pork in frying-pan five minutes; add onion and cook until yellow. Parboil potatoes five minutes; add to onion with corn and water; cook twenty minutes. Thicken milk with butter or drippings and flour cooked together. Combine mixtures; add cracker crumbs and seasonings, and serve.

Succotash may be substituted for corn.

Split-Pea or Bean Soup.

1 cup of split peas, or
1 cup of dried beans
1 tablespoon of butter or drippings
2 quarts of water
1 tablespoon of flour
Salt and pepper to taste

Let the peas or beans soak overnight in three quarts of cold water. Drain off water and put the soaked peas or beans into a saucepan with two quarts of water and a ham-bone, if you have it, otherwise it may be omitted. Let simmer for four or five hours, or until the peas or beans are perfectly soft. (Add more water from time to time, if necessary.) Press through a sieve; adding enough stock or water to make a soup of the consistency of cream. Put it again into a saucepan on the fire; season, and add one tablespoon of butter or drippings and one tablespoon of flour rubbed together until smooth.

An onion may be boiled with the peas or beans if desired.

Serve croutons with the soup. (Croutons are small pieces of bread fried in butter or drippings.)

Macaroni, Spaghetti and Noodles

Baked Macaroni

¼ pound of macaroni
¼ pound of grated cheese
½ cup of milk
1 tablespoon of butter or butter substitute
Salt and pepper

Break the macaroni in convenient lengths, put it in a two-quart kettle and nearly fill the kettle with boiling water; add a teaspoon of salt and boil rapidly twenty-five minutes (the rapid boiling prevents the macaroni from sticking together); drain in a colander, then throw into cold water to blanch for ten minutes; then drain again in the colander. Put a layer of macaroni in the bottom of a baking-dish, then a layer of cheese, then a sprinkling of salt and pepper, then another layer of macaroni, and so con-

tinue until all is used, having the last layer macaroni. Cut the butter or butter substitute in small bits; distribute them evenly over the top; add the milk and bake until a golden brown (about twenty minutes) in a moderately quick oven. Serve in the dish in which it was baked.

Macaroni Baked with Tomatoes.—Arrange in a baking-dish layers of cooked macaroni, stewed and seasoned tomato or canned tomato pulp, and chopped green pepper. Dot each layer with butter or butter substitute. Cover all with cracker crumbs. Bake in hot oven.

Italian Macaroni.

¼ pound of macaroni
¼ pound of grated cheese
½ pint of milk
1 tablespoon of butter or drippings
Salt and white pepper to taste

Break the macaroni in convenient lengths. Put in a two-quart kettle and nearly fill the kettle with boiling water; add a teaspoonful of salt and boil rapidly twenty-five minutes; then drain. Put the milk into a double boiler; add to it the butter or drippings, then the macaroni and cheese; stir until thoroughly heated, add the salt and pepper, and serve.

Macaroni or Spaghetti with Tomato Sauce.—Boil macaroni or spaghetti in water for thirty minutes; drain off the water and serve the macaroni with tomato sauce and cheese.

Noodles.—Throw a few noodles at a time into boiling, salted water; boil them until they are done, separating them carefully with a fork to prevent their matting together. Skim them out when done, and keep them on a warm dish in a warm oven until enough are cooked. Season with butter. Put them in the dish in which they are to be served, and sprinkle over them bread crumbs browned in hot drippings to a golden color. This dish may be served with fish, with meat, or as a course by itself. Noodles may also be cooked like macaroni, with cheese.

Cheese

Cheese Relish.

1 cup bread broken in small pieces
½ cup cheese
1 teaspoon salt
⅛ teaspoon pepper
1 cup milk
1 egg
1 tablespoon butter or drippings

Mix ingredients well, place in greased baking-dish and bake 25 minutes.

Cheese Fondue.

1 cup scalded milk
1 cup stale bread crumbs
¼ lb. mild cheese (in small pieces)
1 tablespoon butter or butter substitute
½ teaspoon salt
3 eggs

Mix first five ingredients; add yolks of eggs beaten until stiff. Fold in whites of eggs beaten until stiff. Pour into greased baking-dish and bake twenty minutes in moderate oven.

Cream Toast with Cheese.—Make toast; make white sauce. To white sauce, just before taking from the fire, add ½ cup of grated cheese. When this is melted, pour over the toast.

Peas

Pea Timbales.—Drain and rinse one can peas, and rub through a sieve. To one cup pea pulp add two beaten eggs, two tablespoons melted butter or drippings, two-thirds teaspoon salt, one-eighth teaspoon pepper, few grains cayenne, and a few drops onion juice. Turn into greased moulds, set in pan of hot water, cover with greased paper, and bake until firm. Serve with one cup white sauce to

which is added one-third cup canned peas drained, rinsed and cooked slowly for fifteen minutes.

Creamed Peas.

2 cups of boiled peas ¾ cup white sauce

Cook the peas; add them to the white sauce and then cook gently for about two minutes. If left-over peas are used, heat slightly before adding to the white sauce.

Spring Salad.

Cold cooked green peas Cold boiled potatoes

Cut potatoes into dice. Mix peas and potatoes together with mayonnaise dressing, then serve on lettuce leaves.

Beans

Baked Beans.—Soak beans overnight in cold water. In the morning drain off the water and cover with fresh water. Cook beans gently until skins begin to break. Place a layer of beans in a bean pot or deep earthen dish and on this layer in the center of the dish place a piece of salt pork (streak of fat and streak of lean), have rind side up. For each quart of beans use one-half pound pork; score the rind. Fill dish with beans, add seasoning and water to cover. (One tablespoon salt and one-half teaspoon pepper to one quart beans.) Mix seasoning with the water. One tablespoon mustard may be added; also one-half tablespoon molasses and one onion. Instead of pork, a piece of salt or fat beef or mutton may be used, or the fat trimmed from a cooked piece of corned beef. In this case use one and one-half to two pounds meat to one quart of beans. If fresh meat is used, add more salt. If salt meat is used, one teaspoon salt is sufficient. When mutton is used, trim off every particle of skin. Bake the beans in a very moderate oven eight to ten hours. Add a little boiling water from time to time, but never enough to bring the water above the beans. Do not cover beans while baking.

Bean Polenta.

1 pint of small white beans
1½ tablespoons of molasses
½ teaspoon mustard
1 tablespoon of butter or drippings
1 tablespoon of vinegar
Salt and pepper to taste

Wash the beans and soak them overnight in cold water. In the morning, drain off this water, cover with fresh, cold water, bring slowly to a boil, and boil slowly one hour; drain again, cover with one quart of fresh boiling water, and boil slowly another hour. When done, press through a colander, return to the kettle, add the butter or drippings, molasses, mustard, salt, pepper and vinegar; stir, and boil ten minutes.

Kidney beans with brown sauce.—Put one tablespoon of butter or dripping in a saucepan and brown until dark, but do not burn it. Add one tablespoon flour; stir and brown again. Add cup good stock (beef is best); season with salt and pepper.

Cook one pint fresh shelled beans in salted water until tender. Add the sauce, and cook one minute longer.

Lentils

Baked Lentils.

1 quart lentils
1 quart water
1 teaspoon salt
½ teaspoon pepper
6 ounces salt pork
1 small onion

Pick over and wash lentils. Soak in water overnight. In morning, pour water off. Put lentils in stew-pan with two quarts cold water and heat slowly. As water boils, the lentils will rise to the top. Remove them with a skimmer and place in a deep earthen dish with pork and onion in the center. Mix salt and pepper with one quart boiling water and add. Cook slowly in moderate oven four to five hours, adding a little water from time to time. If pork is not very salt, more salt should be added.

Stewed Lentils are prepared in the same way, but using more water. Instead of pork, fat corned beef or the shank of a ham may be used.

Curried Lentils.

1 cup lentils
1 pint vegetable stock or water
1 teaspoon salt
3 tablespoons butter or drippings
2 onions
1 tablespoon curry-powder

Wash the lentils and soak them. Drain and cook in the stock or water one hour. When done, they should be a dry mass. Melt the butter or drippings, add sliced onions and curry-powder. Fry until the onions are brown. Add lentils. Season and heat. Serve with boiled rice.

Lentils and Rice.—Boil the lentils as directed in the preceding recipe. Wash and boil one cup of rice. Put two tablespoons of butter or drippings in a frying-pan; when melted add one onion cut in slices, then the lentils and rice, and stir over the fire fifteen minutes; add salt and pepper to taste, and serve.

Nuts

Nut Loaf.

2 cups soft bread crumbs
1 cup milk
2 cups chopped nuts
½ teaspoon salt
1 egg
1 teaspoon Kitchen Bouquet
⅛ teaspoon pepper
1 tablespoon butter or drippings

Soak the crumbs in milk until soft, add remaining ingredients. Pour into bread-pan, baste with water or drippings, and bake one hour. Serve hot or cold with tomato sauce.

Nut and Cheese Roast.

1 cup grated cheese
1 cup bread crumbs
Juice ½ lemon
1 cup chopped nuts
1 tablespoon butter or drippings
2 tablespoons onion
Salt
Pepper

Cook chopped onion in the butter or drippings and a little water until tender. Mix other ingredients, moisten with water, using that in which onion was cooked. Pour into a shallow baking-dish and brown in the oven.

Nut Scrapple.

2 quarts boiling water — 1 cup hominy
2 cups corn meal — 1 tablespoon salt
2 cups nut meats

Cook the corn-meal and hominy together in the boiling water in a double boiler. When it has been cooking 20 minutes, add the salt, and cook until the corn-meal and hominy have taken up all the water. Add chopped nuts and pour in a greased dish. Keep in a cold place. Cut in slices and fry. Serve with or without syrup.

Nut and Celery Salad.—Mix equal parts of nut meats cut in pieces and celery cut in small pieces. Mix with French dressing. Serve with lettuce.

Nut Muffins (Without Eggs).

2 cups flour — 1 cup milk (scant)
¼ cup sugar — ½ cup nut meat
4 teaspoons baking-powder — ½ teaspoon salt
2 tablespoons butter or butter substitute

Mix and sift dry ingredients; work in butter or butter substitute with tips of fingers; add milk and nuts. Bake in muffin-pans for twenty to twenty-five minutes.

Bananas

Moulded Cereal with Banana.—Turn any left-over breakfast cereal, while still hot, into cups rinsed in cold water, half filling the cups. When cold, scoop out the centers, and fill the open spaces with sliced bananas; turn from the cups on to a buttered agate pan, fruit downward, and set into a hot oven to become very hot. Remove with a broad bladed knife to cereal dishes. Serve at once with sugar and milk.

Baked Bananas.—Arrange bananas in a shallow pan, cover, and bake until skins become very dark in color. Remove from skins, and serve hot sprinkled with sugar.

Banana Fritters.—Remove skins from four bananas. Cut each one in four equal parts. Sprinkle with four tablespoons sugar, four tablespoons lemon juice, and let stand one hour. Dip in batter; fry in deep fat; drain on brown paper. Serve.

Banana Fried in Crumbs.—Remove skin from six bananas, cut in halves lengthwise and crosswise. Sprinkle with salt and pepper and lemon juice, dip in flour, egg and crumbs, and fry in deep fat. Drain on brown paper. Serve with or without lemon sauce.

Banana Sandwich.—Slice the bananas and lay between slices of buttered bread. Salt lightly.

Banana and Nut Salad.—Cut bananas in half lengthwise; sprinkle with finely chopped nuts and serve on lettuce with mayonnaise dressing.

Potatoes

Potatoes au Gratin.

6 cold boiled potatoes
2 cups of milk
2 tablespoons of butter or butter substitute
3 tablespoons of flour
4 heaping tablespoons grated cheese
Salt and pepper to taste

Put the butter or butter substitute in a frying-pan to melt; when melted, add the flour, mix until smooth; then add the milk, and stir continually until it boils. Take from the fire, add the cheese, salt, and pepper. Put a layer of this sauce in the bottom of a baking-dish, then a layer of the cold potatoes, sliced, and so on, having the last layer sauce; sprinkle bread crumbs over the top, and put it in a quick oven ten minutes, to brown. Serve in the dish in which it was baked.

Potato Croquettes.—To two cups of well-seasoned mashed

potatoes add the beaten yolks of two eggs, a tablespoon of chopped parsley, one and a half tablespoons of butter or butter substitute (if none has been used in seasoning), a dash of cayenne and nutmeg; stir over the fire until the potato leaves the sides of the pan. When cold, form it into small croquettes, roll them in egg and bread crumbs and fry them in hot, deep fat to an amber color.

German Potato Salad (*Six Persons*).

10 medium potatoes	4 tablespoons good olive oil
1 onion	5 tablespoons of vinegar
1 teaspoon of salt	Chopped parsley
½ teaspoon of pepper	1 yolk of egg

Boil and peel the potatoes and slice them while still hot. Spread over the potatoes the onion, sliced fine, and then sprinkle on the salt and pepper. In a bowl mix the yolk of egg, the oil and vinegar, and then pour it over the potatoes.

Now pour over all three-quarters of a teacup of boiling water. This is the great point in order not to have the salad have the common fault of being too dry. After thoroughly mixing, cover the salad, and let it stand for a few hours. Garnish with parsley.

Cabbage

Cabbage with Cheese.—Boil the cabbage in the usual manner. Press out all the water and chop it. Make a white sauce of one tablespoon each of butter and flour, one cup of milk, one-half teaspoon of salt and a dash of cayenne. Spread a layer of cabbage on the bottom of a pudding-dish; cover it with white sauce; then add a layer of grated cheese. Make a second layer of cabbage, sauce and cheese; cover the top with a layer of crumbs, and place it in the oven. When the sauce bubbles through the crumbs it is done. Serve in same dish.

Stuffed Cabbage.—For this select a nice head of Savoy

cabbage. Pour over it boiling water, let stand fifteen minutes, drain, scald again and let stand thirty minutes. Drain and shake until dry. Make the stuffing as follows: Wash two heaping tablespoons of rice in cold water, then mix it with a half-pound of sausage meat, add a tablespoon of onion and a tablespoon of chopped parsley; mix all well together. Open the cabbage carefully to the very center; put in a half-teaspoon of the mixture, fold over two or three of the little leaves; now cover these with a layer of the mixture, fold over this the next layer of leaves, and so on until each layer is stuffed. Press all firmly together, tie in a piece of cheese-cloth, put it into a kettle of salted boiling water, and boil two hours. When done, carefully remove the cloth, stand the cabbage in a deep round dish, pour over it cream sauce, and serve very hot.

Tomatoes

Stuffed Tomatoes.

1 cup cooked cereal
½ teaspoon salt
A little pepper
1 teaspoon onion juice
1 tablespoon chopped parsley
2 tablespoons melted butter or drippings

Remove the inside of the tomato; fill with the dressing, and brown in the oven.

Curried Tomatoes.

1 qt. stewed tomatoes or
1 qt.-can of tomatoes or canned tomato pulp
1 cup boiled rice
1 teaspoon curry-powder
Salt to taste

Wash the rice through several cold waters. Add the curry-powder and salt to the tomatoes; mix well. Put a layer of the tomatoes in the bottom of a baking-dish, then a layer of the rice, then a layer of tomatoes, and so on until all is used, having the last layer tomatoes; sprinkle the top over with bread crumbs, place a few bits of butter here

and there over the crumbs and bake in a moderate oven for a half-hour. Serve in the dish in which it was baked.

Peppers

Stuffed Peppers.—Use green sweet peppers of uniform size. Cut a piece off the stem end, or cut them in two lengthwise, and remove the seeds and partitions. Put them in boiling water for five minutes to parboil. Fill each one with a stuffing made of equal parts of softened bread crumbs and minced meat (any left-over meat) well seasoned with salt, butter, or drippings, and a few drops of onion juice. Place them in a baking-dish with water or stock half an inch deep, and bake in a moderate oven for half an hour. Serve them in the same dish or remove them carefully to another dish. Any left-over vegetable can be used in place of meat.

Green or Canned Corn

Corn Pudding

4 cups corn
2 cups milk
Salt
3 eggs
½ cup butter or butter substitute
Pepper

Beat yokes; add corn, milk, butter or butter substitute, salt and pepper. Pour into a greased baking-dish; add beaten whites and bake in moderate oven one hour.

Corn, Tomato and Cheese

6 tablespoons of drippings
¾ cup canned or fresh grated corn
½ cup tomato purée or canned tomato pulp
1 clove garlic
2 cups grated cheese
1 teaspoon salt
½ teaspoon paprika
4 slices bread

Melt drippings; add cheese, and stir until it melts. Add corn; stir for a moment, then add tomato, salt and paprika. Toast bread on one side, rub lightly on the other with garlic

cut in half. Pour mixture over untoasted side and serve at once. A poached egg is sometimes placed on top of each portion, making a very nutritious combination.

Corn Fritters

1 cup canned or fresh grated corn	½ cup of milk
1 egg	½ cup of flour
1 teaspoon baking-powder	½ teaspoon of salt
	2 dashes of black pepper

To the corn add the milk, the yolk of the egg, salt, pepper and flour; beat well. Beat the white of the egg to a stiff froth, and stir it and the baking-powder carefully into the mixture. Put lard or drippings into a saucepan; when hot, drop the mixture by spoonfuls into the deep fat. When brown on one side, turn and brown the other. Take out with a skimmer (do not pierce them with a fork, as it makes them heavy), drain on brown paper, and serve very hot.

How to Use Left-overs

European housewives are noted for knowing how to combine left-overs in such a way as to make most savory and nourishing dishes; indeed, it is a common saying that a European family can live on what the average family in this country throws away.

Every scrap of food left over from a meal can be used in some way.

Learn to save money by avoiding waste.

If possible, buy for more than just one meal at a time; in other words, when buying, plan to have something left over for another meal, particularly where the cooking takes a long time or where the food can be reheated to advantage. This will save time, labor and money.

Left-over Meat.—Left-over beef, lamb, mutton and veal are excellent for hash, scalloped dishes, croquettes, a loaf, and salads. Left-over beef, lamb or mutton make excellent

stews with the addition of any left-over vegetables. Any left-over meat, vegetables and gravy can be used to make a meat pie. A left-over ham-bone will greatly improve the flavor of pea or bean soup. Any kind of cold meat can be chopped and used in an omelet, or, combined with rice and tomatoes, used for scalloped dish.

Left-over Poultry.—Left-over chicken or turkey makes excellent hash, scalloped dishes, croquettes, creamed dishes, and salads. The carcass of a chicken or a turkey makes a splendid soup. Stuffing left from chicken or turkey can be sliced thin, browned in the oven, and served on toast.

Left-over Fish.—Any left-over fish can be used for creamed dishes, croquettes, fish pudding, and scalloped dishes.

Left-over Vegetables.—Vegetables are not hurt by reheating. Left-over vegetables can be used for flavoring soups, for making cream soups, scalloped dishes, vegetable hash, filling for an omelet, and for salads. The leaves of celery and any left-over parsley are valuable in the soup pot for flavoring. They can be dried out in a luke-warm oven and kept in a covered jar until needed. The celery roots can be saved for soup stock, and the water in which stewed celery has been cooked can be saved and used for cream of celery soup. The tops of summer beets and turnips, and the outer leaves of lettuce can each be cooked as spinach. They make excellent greens.

Left-over Eggs.—Any left-over poached or soft-cooked eggs may be returned to the hot water and cooked until hard. They can then be chopped and used with left-over meat or fish dishes. Any left-over fried eggs, pieces of omelet or scrambled eggs will improve a meat hash. When only the yolk of the egg is used, the white can be kept in a cup or glass, covered with a damp cloth fastened with an elastic band; or, if only the white is used, the yoke can be kept in the same way.

Left-over Cereals.—Cereals are improved by long cooking. Therefore, oatmeal, hominy and other cereals which are

left over can be added next day to the fresh-cooked cereal. Left-over cereal may be molded cold with fruit, or it may be used in making pancakes, muffins and puddings, and also to make gruels for invalids. Cold hominy and mush may be cut into squares and fried so that a crisp crust is formed on both sides. This makes an excellent vegetable or breakfast dish. Cold hominy or farina may be rolled into balls and fried and used in the same way. Cold rice may be added to soup, made into croquettes, used in a scalloped dish, or it may be mixed with minced meat and egg, and fried like an omelet.

Stale Bread.—Small bits of stale bread may be slowly dried in the oven until crisp and brittle, then ground in a meat-chopper or rolled. These bread crumbs should be kept in a covered jar, and can be used for frying croquettes, etc. Larger pieces of stale bread may be eaten with soup in place of crackers, or used to make croutons for soup. (Croutons are little squares of bread fried in fat. They are usually served with pea, bean and cream soups.) Small pieces and broken slices of stale bread may be used for stuffing, for griddle cakes, bread omelet and puddings.

Cheese.—All the little dried pieces of cheese should be grated and put in a covered glass jar. These cheese-crumbs are excellent for many made-over dishes, and are particularly good with starchy foods, such as potatoes, macaroni, rice, etc.

Sour Milk or Cream.—No sour milk or cream should be wasted. Put it into an earthen or glass jar, little by little, until you have half a cup or a cupful. As soon as it thickens, use it for cottage cheese, griddle cakes, biscuits, cornbread or gingerbread.

Fruit.—Any fresh fruit that has become soft should be cooked at once, with a little sugar added, to make a sauce for puddings, or it can be made into jelly. Any left-over canned fruit may be rubbed through a sieve and used for a sauce.

Left-over Meat Recipes

Warmed-over Beef.—Melt two tablespoons of drippings, add two tablespoons flour, and pour on, gradually, one-half cup stewed and strained tomatoes or canned tomato pulp and one-fourth cup stock or water. Season with one-half teaspoon salt, one-eighth teaspoon paprika, and a few drops onion juice. Add one cup rare cooked chopped beef; cook one minute, and serve.

Scalloped Beef.—Chop sufficient cold cooked beef to make one pint; season with a teaspoon of salt, a tablespoon of chopped parsley and a dash of pepper. Put this in the bottom of a baking-dish. Crush six Uneeda biscuits, pour over them a half pint of milk, let them stand a minute or two, add one egg, well beaten, a half teaspoon of salt and a half teaspoon of pepper. Pour this over the beef and bake in a moderate oven twenty minutes to a half hour.

Other meats may be substituted for beef.

Beef Loaf (of Cold Beef).—Soak one tablespoon of gelatine in one-half cup of cold water ten minutes. Then heat a quarter of a cup of well-seasoned stewed tomatoes or canned tomato pulp to boiling, and pour over gelatine, stirring well until gelatine is dissolved. Have ready two cups of chopped and seasoned meat mixed with one tablespoon of lemon juice and one small sour pickle, minced fine. Stir tomato into meat mixture and mould in an earthen dish. Let stand in mould until jelly is stiff. Serve cold. (Equally good for lamb or mutton.)

Fire Island Stew.—Melt two tablespoons of drippings; add one small onion and cook together until very slightly browned. To this add one and one-half cups of stewed tomatoes or canned tomato pulp and let boil slowly for about 15 minutes or until tomatoes are somewhat thickened. Then add one and one-half cups of cooked macaroni and let all cook together, until well thickened. Just before the

dinner hour, put into saucepan one and one-half to two cups of remnants of tender roast beef, cut small, and thoroughly heat. Do not let the stew boil after the meat is added.

Beef Croquettes.—Take cold roast or corned beef. Put it into a wooden bowl and chop it fine. Mix with it about twice the quantity of hot mashed potatoes or boiled rice, well seasoned with butter or drippings and salt. Beat up an egg and work it into the potato or rice and meat, then form the mixture into little cakes the size of fish balls. Flatten them a little; roll in flour or egg and cracker crumbs, fry in hot fat, browning on both sides. Serve piping hot. Almost any cold meat can be used instead of beef.

Baked Hash.

1 pint of chopped cooked meat
1 pint of chopped raw potatoes
½ pint of gravy or water
1 tablespoon of melted drippings
Salt and pepper to taste

Mix all the ingredients together, turn into a mould and bake in a moderate oven one hour.

Fricandelles.

2 cups of left-over meat, chopped fine
2 tablespoons bread crumbs or 1 cup mashed potatoes
1 tablespoon chopped parsley
1 teaspoon onion juice
1 raw egg
Salt and pepper to taste

Mix ingredients, pat into round flat cakes, and fry in hot fat until brown. Serve with brown gravy, to which has been added a few drops of Worcestershire Sauce.

Meat Pie.—Combine any left-over meat and vegetables and put into a baking-dish. Over this pour any gravy you may have. Then make a biscuit crust and place it over the top of the baking-dish. Put in oven and bake until the crust is brown.

Biscuit Crust.

1 cup flour
2 teaspoons baking-powder
½ teaspoon salt
Enough milk to make a soft dough (about ¼ to ½ cup)
4 level teaspoons butter or butter substitute

Mix and sift the dry ingredients. Then rub in the butter or butter substitute until the mixture looks like meal. Add milk gradually. When all is moistened, turn out on to a floured board; roll out to about one-fourth inch in thickness and spread over the top of the dish.

Cottage Pie.

1 cup chopped meat
1 cup hot water or gravy
2 cups hot mashed potato
½ teaspoon salt
½ cup hot milk
1 tablespoon of drippings
Few grains celery salt
⅛ teaspoon pepper

Put meat in an earthen dish, add salt and pepper to taste, and the hot water. Mix the remaining ingredients with the mashed potato, and spread on top of meat; bake in hot oven until potato is brown.

Pressed Meat.

1 quart of cold, cooked meat, chopped fine
½ teaspoon cloves
¼ teaspoon of black pepper
1 teaspoon of cinnamon
1 teaspoon of allspice
¼ teaspoon of mace
1 cup of boiling stock
Salt to taste

Mix all the ingredients together, then press into a square mould and stand in a cold place to cool. When cold, turn it from the mould, cut it into slices, and serve. For this you can use any meat left from soups.

Browned Hash.—Mix with cooked meat, chopped fine, half as much mashed potatoes and any or all of the following "left-over" vegetables: Corn, string-beans, stewed tomatoes, onions, carrots, celery or cabbage—all chopped fine. Put some fat into a heavy iron pan, and when it is smoking

hot, spread the mixture over it. Let it heat and brown slowly. Then fold it over and serve on a warm platter with poached eggs on top, or with tomato sauce, with some green and red sweet peppers cooked in it.

Shepherd's Pie.

1 pound of cold mutton
1 pint of cold boiled potatoes
1 tablespoon of fat
½ cup of stock or water
Salt and pepper to taste.

The Crust

4 good-sized potatoes
¼ cup of milk
Salt and pepper to taste.

Cut the mutton and boiled potatoes into pieces about one inch square; put them in a deep pie or baking-dish, add the stock or water, salt, pepper, and half the fat cut into small bits. Then make the crust as follows: Pare and boil the potatoes, then mash them, add the milk, the remainder of the fat, salt and pepper. Beat until light. Now add flour enough to make a soft dough—about one cupful. Roll it out into a sheet, make a hole in the center of the crust, to allow the escape of steam. Bake in a moderate oven one hour, serve in the same dish.

Scalloped Mutton.

2 cups tomato sauce or canned tomato pulp
1 cup cooked macaroni
2 cups mutton cut in cubes
1 cup cracker crumbs
2 tablespoons melted fat
Salt and pepper

Arrange the macaroni, mutton, and tomato sauce in layers, sprinkle each layer with salt and pepper, and cover the top with the cracker crumbs which have been mixed with the fat; bake in a moderate oven until the crumbs are brown.

Scrambled Mutton.

2 cups cold mutton, chopped
2 tablespoons hot water
1 tablespoon of drippings
3 eggs
Pepper and salt.

Add the meat to the hot water and drippings. When the meat is hot, break in the eggs and stir constantly until the eggs begin to stiffen. Season with pepper and salt.

Curry of Mutton.

1 pint of finely chopped mutton
1 tablespoon of drippings
1 tablespoon of flour
½ cup of rice
1 tablespoon curry-powder
2 quarts boiling water
Salt to taste.

Wash the rice and put it in the boiling water; let it boil thirty-five minutes. Drain in a colander. Now put the drippings in a frying-pan; when melted, add the flour and stir until smooth; add a half-pint of boiling water; let boil up once, then add meat, curry, and salt. Stir ten minutes. Now heap it in the center of a meat dish, and put the rice around, in a border. Brush all over with beaten egg, and place in the oven a few minutes to brown.

Hashed Mutton.—Cook two tablespoons drippings with one tablespoon finely chopped onion, five minutes. Add two tablespoons flour, and pour on gradually, one cup stock. Add one cup cold chopped, cooked mutton, one-half cup cold boiled potatoes, cut in dice, and one tomato, skinned and cut in small pieces or a little canned tomato pulp. Season with salt, pepper, and celery salt; cover and cook in double boiler for ten minutes.

Mutton or Lamb Croquettes.

2 cups finely chopped meat
1 tablespoon chopped capers
1 cup white sauce
1 cup cooked rice
1 tablespoon lemon juice
Salt and pepper

Mix all together and set away to get cold. When ready to form, take up by full tablespoonfuls and shape into cylinders. Roll gently in finely sifted white bread crumbs, then in egg (slightly beaten with one tablespoon of cold water), being careful that every part of the croquette is covered with egg and then again in crumbs. Fry lightly in smoking hot, deep fat.

Oriental Stew.—Simmer gently together

- 2 cups cold lamb or mutton, cut in cubes
- 1 cup of water
- 2 tablespoons of butter or drippings
- 1 chopped onion
- 2 small cold potatoes, sliced
- 1 cup of cooked peas or cooked string beans, chopped
- ½ cup rice

Season with salt, pepper and a very little curry powder, if liked. While stew is heating, boil one-half cup of rice. When tender, put into hot vegetable dish, hollow out the center and fill with the stew. Serve at once.

Lamb (Turkish Style).—Brown a small onion and one-third of a cup of rice in butter or drippings. Add one cup of stewed tomatoes or canned tomato pulp, one cup of lamb or mutton cut in squares, four tablespoons of minced carrot, one teaspoon of horseradish, salt and pepper to taste. Make quite moist with gravy or hot water. Cover closely and simmer until the rice is soft and the water absorbed. Serve on hot platter.

Minced Lamb.—Chop remnants of cold roast lamb; there should be one cup. Put two tablespoons drippings in hot saucepan, add lamb, sprinkle with salt, pepper and celery salt, and dredge thoroughly with flour; then add enough stock or water to moisten. Serve on small slices of toast.

Roast Lamb or Beef Reheated.—In warming up a leg of lamb or standing rib roast of beef, heap up the cavity left after carving with mashed potato. Brush over with melted drippings and brown in oven.

Left-over Poultry Recipes

Creamed Chicken Hash on Toast.—This is one of the tastiest of all the warmed-over chicken dishes. Chop the chicken fine, and to each pint allow one tablespoonful of butter or drippings, one of flour and a half pint of milk. Rub the butter or drippings and flour together, add the milk, stir over the fire until boiling; season the meat with a teaspoon of salt and a dash of pepper, add to the milk sauce, and cook in double boiler for fifteen minutes. Heap this on squares of nicely toasted bread and serve at once.

Minced Chicken with Green Peppers.—Boil two green peppers ten minutes, remove seeds, and cut in small strips; mix with two cups cooked fowl, cut in dice. Melt three tablespoons dripping, add three tablespoons flour, and pour on gradually one and one-third cups chicken stock. Add chicken and peppers. Season with salt and pepper, and serve on pieces of toast.

Creamed Chicken and Peas.—Melt two tablespoons butter or drippings, add three tablespoons flour, mixed with one-fourth teaspoon salt and one-eighth teaspoon pepper. Pour on gradually one and three-fourths cups milk. When sauce thickens, add one and one-half cups cold boiled fowl, cut in dice, and two-thirds cup left-over peas. Cook for about two minutes.

Chicken with Tomatoes.—Cook four tablespoons drippings with one-quarter of a small onion, finely chopped, five minutes. Add five tablespoons flour, and stir until slightly browned. Pour on, gradually, three-fourths cup each chicken stock and stewed and strained tomatoes or canned tomato pulp. Add one teaspoon lemon juice, one-half teaspoon salt, and one-eighth teaspoon paprika. Add one and one-half cups cold boiled fowl, cut in cubes. Cook for about two minutes.

Chicken Croquettes.—Make a white sauce. Chop chicken fine and season with salt, pepper, and a few drops of onion juice. Put into hot sauce all the seasoned chicken it will take up, about two cups of chicken to one of sauce. Cool. Shape into croquettes; roll in bread crumbs, then in egg (which has been slightly beaten together with one tablespoon of cold water), then in crumbs again. Fry in smoking hot deep fat, and serve with white sauce. Veal or fresh pork may be used in same way.

Chicken Custard.—When boiling a fowl for salad or other purposes, take a pint of the broth. Season as needed with salt and a little pepper. Heat and pour very slowly over two eggs that have been slightly beaten. Cook in a double boiler until the mixture thickens. Pour into small cups that have been rinsed with cold water, and set away to chill. This makes a good relish for invalids.

Scallop of Chicken or Turkey with Celery.—Cook one cup of celery, cut in inch pieces, in boiling slightly salted water until tender. Save the water to make sauce. Slice thin two cups of cold chicken, discarding all skin; season with salt and pepper, and moisten with a little left-over gravy. Melt two tablespoons of butter or drippings, stir in two tablespoons of flour, and add slowly one cup of celery water, one-half cup of milk, one-quarter teaspoon of salt, and a little pepper. When thickened and smooth, stir in the cooked celery. Put a few crumbs in a baking-dish and arrange the chicken and sauce in alternate layers. Cover with crumbs. Brown in a hot oven.

Chicken or Turkey Hash.

1½ cups cold chopped chicken
¾ cup boiled potato, cut in small pieces, or ¾ cup rice
½ to ⅔ cup chicken gravy

Mix together, season highly, and moisten with the chicken gravy. Grease a baking-dish; put in the mixture, covering

the top with crumbs. Bake for about fifteen minutes in a hot oven.

Left-over Vegetable Recipes

Stuffed Potatoes.—Baked potatoes that are left over must be made into stuffed potatoes before they are heavy and cold. At the close of the meal at which they were first served, cut the potatoes directly into halves, scoop out the inside portion, put it through an ordinary vegetable press, or mash it fine; add a little butter, salt, pepper and sufficient milk to make a light mixture; stand this over hot water and beat until light and smooth. Put it back into the shells, and stand them aside in a cold place. When ready to serve, brush the top with beaten egg and run them into a quick oven until hot and golden brown.

Potato Croquettes.—Cold mashed potatoes may be made into croquettes by adding to each pint four tablespoons of heated milk, the yolks of two eggs, a tablespoon of chopped parsley, a teaspoon of grated onion, a quarter of a teaspoon of pepper; stir over the fire until the mixture is thoroughly heated; form into cylinder-shaped croquettes, dip in egg and rolled bread crumbs and fry in smoking hot, deep fat.

Curried Vegetables.—Have previously prepared one cup boiled potato, cut in dice, one cup boiled carrots, cut in dice, one-half cup boiled turnips, cut in dice, and one-half cup left-over peas. Cook two slices onion in three tablespoons drippings five minutes. Remove onion, and add three tablespoons flour, one teaspoon curry-powder, one teaspoon salt, one-fourth teaspoon celery salt, one-fourth teaspoon pepper, and one and one-half cups milk. Stir until smooth, then reheat vegetables in sauce.

Left-over Tomatoes.—A half cup of stewed tomatoes or canned tomato pulp may be used with stock for brown tomato sauce, or for making a small dish of scalloped tomatoes, helping out at lunch when perhaps the family is less in

number. The Italians boil down this half cup of tomatoes until it has the consistency of dough; then press through a sieve, add a little salt, pack down into a jelly tumbler and stand in the refrigerator to use as flavoring. A tablespoonful in a soup, or in an ordinary sauce, or mixed with the water for baked beans, or added to the stock sauce for spaghetti or macaroni, adds greatly to the flavor as well as appearance.

Tomato Paste.—When tomatoes are very plentiful and the supply is greater than the immediate need, it is a good plan to make a paste, which will keep for some time in a cool place. Wash and scald tomatoes. Strain through a fine sieve, and boil until thick. Put in glass jars. This will be found very useful in flavoring soups and sauces.

Spinach with Baked Eggs.—Form any cold, well-seasoned spinach into a neat border on buttered toast. A full tablespoonful will answer for each piece of toast. Break an egg in the center of each mound. Season, sprinkle very lightly with buttered crumbs. Bake in the oven until the eggs are "set."

Carrot Croquettes.

1 cup cooked carrots
1 cup cooked peas
1 cup white sauce
1 egg
Salt and pepper

Press carrots and peas through a sieve. Add seasoning, unbeaten egg, white sauce; set away to chill. Form into croquettes, roll in crumbs and egg, and fry in smoking hot, deep fat.

Beets Princess.

1 tablespoon butter
½ cup water
2 tablespoons vinegar

Combine these in the order given and bring to a boil. Then add one teaspoon corn-starch moistened with cold

water. Cook until clear. This makes a transparent sauce for warmed-over beets.

Creamed Beets.—Any left-over beets that have been served with butter and no vinegar may be creamed. Chop them coarse, and to each cup of beets allow one cup of white sauce.

Parsnip Cakes.—Use left-over boiled buttered parsnips for making these cakes. Mash, and season with salt and pepper, make into flat, round cakes, dip in flour, and fry in hot melted drippings or butter.

Celery Toast.—Take the outer and less tender stalks of celery that are often thrown away, cut them into one-half-inch pieces and cook in slightly salted water until tender. Drain and use one-half cup of this water and one-half cup of milk to make a white sauce. Add the celery to the sauce and pour over slices of nicely browned and buttered toast. Serve very hot.

Left-over Egg Recipes

Egg Croquettes.—Put five hard-boiled eggs through a vegetable press, or chopper. Put one tablespoon of butter or butter substitute and two of flour into a saucepan, add a half pint of milk, stir until boiling, add a half cup of stale, unbrowned bread crumbs, a teaspoon of salt, a tablespoon of chopped parsley, a dash of pepper and a half teaspoon of onion juice; add the eggs, mix and turn out to cool. When cold, form into cutlets, dip in egg and then in bread crumbs and fry in smoking hot, deep fat. Serve with plain cream sauce. These with peas make an exceedingly nice dish.

Cold Bacon and Eggs.—An economical way of using bacon and eggs that have been left from a previous meal is to put them in a wooden bowl and chop them quite fine, adding a little mashed or cold chopped potato, and a little bacon, if any is left. Mix and mould into little balls, roll in raw egg and cracker or bread crumbs, and fry in a frying-pan; fry a

light brown on both sides. Serve hot. This makes a very appetizing dish.

Floating Island (*using up white of eggs*).—Beat up whites of eggs until stiff; gradually beat in a very little powdered sugar and drop large spoonfuls in hot milk in frying-pan. Dip milk over egg, that it may cook slightly. Take up in a skimmer and drain. Serve on soft custard with a bit of jelly on top of each spoonful.

Apple Float.—To each cup of left-over apple sauce add the well-beaten white of one egg. The whites must be beaten until perfectly stiff and dry. Then whip apple sauce and egg together with an egg-whisk until thoroughly mixed. Serve ice cold.

Meringue.—One-half tablespoon powdered sugar to each white of egg. Beat the whites till frothy, add the powdered sugar gradually and continue beating. When stiff enough to hold its shape, heap the meringue over the pudding.

Scrambled Eggs (*using up yolks of eggs*).

3 yolks
Dash cayenne
Dried bread or toast
1 large tablespoon bacon (cut in bits)
½ cup milk
½ tablespoon butter

Prepare crisp dry toast, or use oven-dried slices of bread if on hand. Beat eggs slightly, add milk and bacon. Melt butter in hot omelet pan; add the egg mixture, and cook lightly, holding pan up from intense heat. Have hot milk ready in saucepan, dip slices of bread or toast quickly in it, put on hot platter, and pour scrambled eggs over all.

Soft Custard (*using up yolks of eggs*).

1 pint milk
3 yolks of eggs
Few grains salt
3 tablespoons sugar
½ teaspoon vanilla or
A piece of lemon rind

Scald milk with lemon rind, beat yolks, sugar and salt together. Combine by pouring hot milk gradually on yolks and sugar, stirring meanwhile. Strain mixture into double boiler and cook until thickened slightly. Remove at once from double boiler and cool. If vanilla flavoring is preferred add when custard is cold, and omit the lemon rind.

Stale Bread Recipes

Bread Muffins.—Cover a quart of bits of bread that have been broken apart, with one pint of milk; soak for fifteen minutes, then with a spoon beat until you have a smooth paste; add the yolks of three eggs, a tablespoon of melted drippings and one cup of flour that has been sifted with a heaping teaspoon of baking-powder. Mix in carefully the well-beaten whites of the eggs, and bake in muffin-pans in a quick oven about twenty minutes.

Bread Croquettes.—Rub sufficient stale bread to make one quart of crumbs; add four tablespoons of sugar, a half cup of cleaned currants, or any fruit that you have left over, and a grating of nutmeg; sprinkle a teaspoon of vanilla over this and add sufficient beaten eggs (about three) to moisten the crumbs. Form into small cylinder-shaped croquettes, dip in egg and roll in bread crumbs and fry in smoking hot, deep fat. Serve hot with sugar syrup.

Bread Sticks.—Remove crusts from any slices of stale bread and cut in strips about five inches long and one-half inch wide. Fry in smoking hot, deep fat. These can be served with cheese instead of crackers.

Bread Pudding.

3 eggs;
2 cups bread crumbs
½ teaspoon cinnamon
½ cup raisins
2 tablespoons butter
1 quart milk
½ teaspoon salt
Little nutmeg

Scald milk. Add butter and bread crumbs. Beat eggs light and add with salt and spice to bread mixture. Bake in moderate oven about an hour.

Brown Betty.—Place alternate layers of chopped apples and stale bread crumbs in buttered baking-dish, having crumbs on bottom. Add cinnamon and sugar to each layer of apples, using more sugar if apples are sour. The top layer should be buttered bread crumbs. Bake in moderate oven until crumbs are brown.

Bread Griddle Cakes (with sour milk).—Use equal quantities of sour milk and small broken pieces of bread. Mix and let stand, covered, overnight. When ready to use, put through colander. For each pint of mixture use one egg, one teaspoon of soda, one teaspoon of sugar, ¼ teaspoon salt and about ¾ of a cup of sifted flour. It is always well to bake a small cake first, that any lack in ingredients may be remedied at once. An extra yolk or small amount of uncooked egg may be added if at hand. Bake on hot griddle.

Fried Bread.—To an egg, well beaten, add one cup of milk, or a little water. Dip pieces of stale bread in this and then fry them in butter or drippings.

Stale Cake

Stale Cake with Custard.—Moisten with lemon juice enough stale cake to cover the bottom of a glass dish holding a quart. Make a soft custard by scalding two cups of milk and pouring it slowly upon two beaten egg yolks, mixed with three tablespoons of sugar, one teaspoon of butter, and a little salt. Cook in a double boiler until thickened. Strain, and when partly cool, add one-half teaspoon of vanilla, and pour over the cake. When ready to serve, beat the whites to a stiff froth, adding one tablespoon of sugar and a little lemon juice while beating. Drop lightly, by spoonfuls,

on top of the custard and put a few bits of jelly on the meringue.

Trifle.—Cut stale cake into slices and spread preserves between them. Lay in a deep dish and spread over with meringue or whipped cream.

Cereals

Save-the-Wheat Breads

Cornmeal and Oatmeal Yeast Breads.—Cornmeal yeast bread, satisfactory in texture and mild in flavor, can be made, using 20 per cent by measure or 25 per cent by weight of total cereal as cornmeal. The flavor of white cornmeal is less distinctive and the bread made from it differs in color from that of the usual wheat loaf less than that made from the yellow meal. These breads may be made by combining dry cornmeal with the flour, but the product is less satisfactory than that in which the meal is first cooked as for cornmeal mush. The manipulation is the same as for wheat bread, except that it is a little more difficult to knead into the mush the full amount of flour, and the dough is somewhat softer and stickier. Baking should occur in a slower oven, and should continue over a longer period—at least an hour.

Oatmeal yeast bread is coarser than wheat bread, and is not unlike Graham bread in appearance. It has a sweet, nutty flavor, much liked by persons who care for whole wheat or dark breads. Some care is necessary in combining the rolled oats with the mixture. The most satisfactory method has been found to be that of pouring the hot liquid over the rolled oats, allowing the mixture to cool rather slowly (about half an hour). Longer soaking of the oats produces a somewhat moister bread. The manipulation is the same as for wheat bread. The dough is a bit softer. Baking requires about 45 minutes.

All proportions are for one loaf. The amount of yeast

provides for a very short process—3½ to 4 hours. One-half the yeast suggested will make bread in 5 hours.

One cake of dry yeast used as a starter should produce yeast for six loaves. In all cases the amount of liquid should be equal to that added with the compressed yeast in the recipe given.

Cornmeal Yeast Bread. (1 Loaf.)

- 1¼ cups milk and water, or water (10 oz.)
- 2 tablespoons sugar (1 oz.)
- 1 tablespoon fat (½ oz.)
- 2 teaspoons salt (½ oz.)
- ⅔ cup cornmeal (3⅓ oz.)
- 2⅓ cups flour (9⅓ oz.)
- ½ cake compressed yeast (¼ oz.)
- ¼ cup warm water (2 oz.)

Add sugar, fat, and salt to liquid, and bring to boiling point. Add cornmeal slowly, stirring constantly until all is added. Remove from fire, cool mixture, and add compressed yeast softened in ¼ cup warm water. Add 2⅓ cups flour and knead. Let rise until about double its bulk, knead again, and put in the pan. When light, bake in a moderate oven for at least an hour.

In mixing the dough, the flour and cornmeal are to be used as separate ingredients, because the cornmeal must be scalded or a grainy bread results. When the cornmeal mixture is removed from the stove, the housewife will doubt her ability to add the amount of flour called for. The flour will work in, as required, but a stiffer, stickier dough than that to which she is accustomed will result.

Oatmeal Yeast Bread (1 Loaf.)

- 1 cup milk and water, or water (8 oz.)
- 1 teaspoon salt (¼ oz.)
- 1 tablespoon fat (½ oz.)
- 2 tablespoons sugar (1 oz.)
- 1 cup rolled oats (2¾ oz.)
- 2½ cups wheat flour (10 oz.)
- ½ cake compressed yeast (¼ oz.)
- ¼ cup warm water (2 oz.)

Scald liquid and pour it over the rolled oats, sugar, salt, and fat. Let stand until lukewarm (about half an hour). Add yeast softened in warm water. Add flour and knead. Let rise until double its bulk. Knead again and place in pan. When light, bake in a moderate oven from 45 to 60 minutes.

Potato Yeast Bread.—Boiled potatoes, mashed and combined with wheat flour may be used in making a bread of good flavor and texture. The potato bread is slightly darker in color than patent flour bread, and is also somewhat more moist. It is relished by persons who do not care for any but so-called "white bread." Two manipulations are satisfactory. Either all the flour may be added in the first mixture, making a dough which is very stiff and difficult to knead, or, a part of the flour may be reserved and added with the second kneading. In either case, the dough is soft at the second handling, but after baking it produces a satisfactory loaf. The following amounts make three loaves of bread.

½ cup milk and water, or water (4 oz.)
4 tablespoons sugar (2 oz.)
4 tablespoons fat (2 oz.)
1½ teaspoons salt (⅜ oz.)
4 cups boiled potatoes
8 cups flour (32 oz.)
½ cake compressed yeast (¼ oz.)
¼ cup warm water (2 oz.)

Barley Yeast Bread.—Bread may be made using wheat flour and barley flour, in mixtures containing from 33⅓ to 50 per cent barley flour. The bread containing one-third barley flour is light, palatable, and of especially pleasant flavor. A larger percentage produces a heavier, darker bread of pronounced barley flavor. The manipulation for this bread is the same as for wheat bread. The conditions and time for baking are also the same. The loaf is smaller.

1 cup milk and water, or water (8 oz.)
1 tablespoon sugar (½ oz.)
1 tablespoon fat (½ oz.)
1 teaspoon salt (¼ oz.)
1⅙ cups barley flour (4 oz.)
2⅓ cups wheat flour (9⅓ oz.)
½ cake compressed yeast (¼ oz.)

Soften the yeast in part of the liquid. Combine ingredients. Mix into a dough. Knead and let rise to double original bulk. Knead again. Put in the pan, and when again double in bulk bake about 45 minutes.

Rye Yeast Bread.—Commercial rye breads are made of a mixture of wheat and rye flours, known in the trade as 50-50. Rye flour has much less expansion than wheat flour; hence, the loaves are smaller. The manipulation is the same throughout as for wheat bread.

1 cup milk and water, or water (8 oz.)
1 tablespoon fat (½ oz.)
2 tablespoons sugar (1 oz.)
1 teaspoon salt (¼ oz.)
2¼ cups rye flour (7 oz.)
2¼ cups wheat flour (9 oz.)
½ cake compressed yeast (¼ oz.)
2 tablespoons water (1 oz.)

Combine ingredients. Mix into dough and knead. Let rise until double original bulk. Knead again. When again double bulk, bake about 45 minutes.

Rice Yeast Bread.—Cooked rice, combined with wheat flour makes delicious muffins and yeast bread. There are many ways of cooking the rice. The basic principles may be stated as follows: First, cook the rice so as to conserve all mineral matter and other soluble products.

Method: After the rice is thoroughly washed it should be put in a thick iron kettle or stoneware baking dish, cold water added so that the water stands three-quarters of an inch to an inch clear above the rice. A heavy or weighted

cover should be used to seal the dish Cook slowly over direct heat or in the oven until all the water has been absorbed and the grains are soft and steam escapes from the vessel. This is the Japanese method. The second method, more frequently used in the United States, is to use a very large amount of boiling water to a small amount of rice, the rice being added slowly enough not to stop the boiling. The water is boiled briskly twenty minutes, or until the kernels are tender. Then it is drained in a colander or strainer, set on the back of the stove, or put in a slightly warm oven or in a pan over hot water, to dry off a bit. There results a fluffy mass of large, plump grains, each perfectly distinct in itself, instead of the gummy mush so often served as boiled rice.

The rice yeast bread is very white in color, is moister than wheat bread, and keeps moist longer. It is handled in much the same manner as wheat bread. The first dough, however, is much stiffer, and after once rising the light dough is so soft that it cannot be kneaded with the hands. It should be well stirred, with a strong spoon, and placed in the pans, looking much like a stiff drop batter. After baking, the upper crust is less smooth than that of our familiar wheat flour loaf.

½ cup milk and water, or water (4 oz.)
4 tablespoons sugar (2 oz.)
4 tablespoons fat (2 oz.)
1½ teaspoons salt (⅜ oz.)
7 cups boiled rice
8 cups flour (32 oz.)
½ cake compressed yeast (¼ oz.)
¼ cup warm water (2 oz.)

Scald liquid, if milk is used. Pour over fat, sugar, and salt. Cool and add yeast, moistened in ¼ cup warm water. Add rice and flour and knead. After second rising bake 45 minutes. These amounts make two large or three small loaves of bread.

Rice

Although rice has been recognized as a good food in the United States since early colonial times, and in some form or other is generally liked in all parts of the country, it has not been given so important a place as a staple article of diet as it deserves, say specialists of the United States Department of Agriculture.

When rice is used in quantity in the diet, particularly as a substitute for potatoes, care should be taken to supply fruits and vegetables generously in order that the mineral substances which the body needs may be provided.

Rice is nutritious and palatable and digests well. It may be cooked quickly, without the necessity of troublesome preparation, and without waste.

As a staple article of diet, rice may be boiled in salted water and used like potato or sweet potato as a vegetable at a meal at which meat, eggs, beans, gravy, or other foods rich in protein are served. Wholly or partially cooked rice can be used with cheese, minced meat, or poultry, fish, eggs, beans, etc., for a variety of made dishes, the combinations constituting dishes in which most of the needed food elements are present. It also may be used as a major or minor ingredient in stews and soups.

Instead of serving rice plain as a vegetable it may be stewed with tomatoes, cooked in a double boiler with tomato juice, soup stock, or milk, or it may be seasoned with curry powder, onions or other seasoning materials. By using skim milk in this way an economical dish is produced.

As a cereal for breakfast, rice may be boiled in milk and sweetened, or eaten with butter and salt. If it is desired, dried fruits such as dates or raisins may be cooked with the rice. Cold, boiled rice, mixed with pancake or muffin batters of wheat, buckwheat, or corn meal, makes a pleasing addition to such food products, reduces the quantities of

other ingredients needed, and furnishes a method for using the left-over cereal. Cold, boiled rice also may be used with or without a little meat, chicken, or seasoning vegetable for croquettes; and with eggs, sugar, milk, or other ingredients for making a variety of puddings and other desserts, as an examination of almost any good cookbook will show.

Boiled rice prepared in southern fashion, so that all of the grains are kept separate, is sufficiently attractive in appearance to justify its slight wastefulness, except, of course, where strictest economy is necessary. Slowly add a cupful of thoroughly washed rice to a quart of rapidly boiling water, which contains 2 level teaspoonfuls of salt. If carefully done, the boiling (which should continue all of the time the rice is cooking) will not be stopped. Stirring is not permitted, as this will break the rice grains. About 20 minutes is sufficient to cook the rice, which can be tried from time to time by taking one or two grains between the fingers. Pour off all the water from the cooked rice, cover with a cloth, and place in a warm part of the stove, so that the grains will swell. To remove the starchy material from the outside of the grains, cooks sometimes turn the cooked rice into a strainer and pour 1 quart of hot water over it before covering with a cloth and allowing to steam and swell. A cupful of raw rice cooked in this way will give over 4 cupfuls of very white and light boiled rice. The water drained off from the rice can be used in soup making to save the starch and mineral matter which it contains.

If one wishes to use a fireless cooker, add a cupful of well-washed rice to 3 cupfuls of boiling water, in which 2 level teaspoonfuls of salt are dissolved. Cook for 5 minutes and then put in a fireless cooker. In 2 hours the rice should be done. If any water remains unabsorbed, it can be drained off. Rice varies somewhat in the amount of water it absorbs, and the housekeeper accordingly should vary the amount of water used.

Rice cooked as described above is excellent when served as a vegetable with meats, as in the well-known "chicken and rice." Such uses of rice are particularly welcome in the period when "old potatoes" are not very palatable and "new potatoes" have not yet appeared in the locality or are high in price in market.

Another dish which has almost as good an appearance may be prepared by cooking rice in a double boiler, without stirring, and using about three cupfuls of water and a level teaspoonful of salt to each cupful of rice.

As the basis of a sweet dessert, rice is always useful, especially so for invalids and little children. If combined with milk and eggs it makes a very nutritious dish as well as one easily digested. Plain boiled rice, cooked either in water or in milk, and served with a little stewed fruit, maple syrup, honey, or other simple flavor, makes a more wholesome dessert for children than rich puddings or pies because it is less likely to upset the digestion or to destroy the appetite for simple foods.

Cold rice, particularly that which is cooked so that the grains are separate, is a good addition to vegetable salads, combining well with celery, string beans, and tart apple. If one wishes, some chicken cut in small pieces also can be added.

Rice Croquettes.—To make cold boiled rice into croquettes, the rice must be reheated in a double boiler with ½ cup of milk and the yolk of an egg to each cup; you may season with sugar and lemon or salt and pepper, and serve as a vegetable. Form into cylinder-shaped croquettes; dip in egg and bread crumbs, and fry in smoking hot deep fat.

Savory Rice

2 tablespoons butter or drippings
6 tablespoons boiled rice
4 tablespoons chopped cooked carrots
3 tablespoons grated cheese
1 chopped hard-boiled egg
Milk

Melt the butter or drippings and add the rice, carrots, cheese and egg. Moisten with milk and season well. Heap on a dish and brown in the oven. (The hard-boiled egg can be left out, if not wanted.) In food value this dish takes the place of both meat and potatoes.

Rice with Tomatoes. Wash and drain one-half cup rice, cook in one tablespoon butter or dripping until brown, add one cup boiling water, and steam until water is absorbed. Add one and three-fourths cups hot stewed tomatoes or canned tomato pulp, cook until rice is soft, and season with salt and pepper.

Baked Rice and Cheese

3 cups boiled rice
½ pound cheese
1 cup milk
½ teaspoon salt
2 tablespoons flour

Make sauce by thickening milk with flour. Add cheese, stirring until it is melted. Arrange layers of rice and sauce in baking-dish, cover with crumbs and bake until brown. In food value this dish takes the place of both meat and potatoes.

Rice Muffins

2¼ cups flour
¾ cup hot cooked rice
5 teaspoons baking-powder
2 tablespoons sugar
1 cup milk
1 egg
2 tablespoons melted butter or any fat
½ teaspoon salt

Mix and sift flour, sugar, salt and baking-powder; add one-half milk, egg well beaten, the remainder of the milk mixed with rice, and beat thoroughly; then add butter or fat. Bake in greased muffin rings placed in greased pan or bake in greased gem pans.

Steamed Mutton and Rice

4 cups cooked rice
2 cups cooked mutton cut into small pieces
1 teaspoonful salt
Few drops onion juice
1 tablespoonful chopped parsley
¼ cup bread crumbs
1 egg
¼ teaspoonful pepper
Stock or water as needed

Grease a mold or a bowl of about 1½ quarts capacity and line with cooked rice. Heat the meat with the other ingredients, using enough stock to make a mixture that is moist, but will hold its shape. Pack the meat in the center of the mold and cover with the remaining rice, grease the cover of the mold (if a bowl is used, a plate will serve for a cover), steam or cook in water enough partly to cover the mold until the contents are thoroughly heated through. Turn on a hot platter and serve with tomato sauce.

The above recipe, it will be noted, suggests the use of bread crumbs instead of flour for thickening, which is often a way of saving bread which might otherwise be wasted, and which is also one way of securing variety, as a different texture results from that when flour is used.

If one finds it convenient, cold lamb, veal, or chicken may be used in place of mutton in preparing this dish.

Corn Meal in the Diet

One way to reduce the cost of food for the family, say the specialists of the United States Department of Agriculture, is to use more corn meal, where this is low in price as compared with other cereals. Corn meal when bought at retail stores, costs about half as much per pound as wheat flour, one-third as much as rolled oats, one-fourth as much as rolled wheat, and about half as much as broken rice. That is, it costs much less per pound than any of the other popular

cereal foods, yet even the bolted corn meal usually sold, from which the germ of the grain has been removed to make the meal keep longer, has a food value which compares favorably with that of wheat flour. It does not supply quite so much protein or mineral matter for building the tissues of the body, but, on the other hand, it gives more fat and starch, pound for pound, and its value as fuel for the body is fully as high.

A dish of mush and milk has made the greater part of many a supper on the farm, and children thrive on it, though they may rebel at cleaning the kettle and the "pudding spoon" afterwards, if the old-time methods of cooking it are followed.

Corn Meal Mush and Similar Dishes

In making corn-meal mush, or "hasty pudding," with water, allow three and one-half times as much liquid as meal; if milk is used, allow four or more times as much as of meal. Recipes for making this dish almost invariably direct that the meal be poured into boiling water, either in dry form or mixed with cold water or milk. Directions for preparing the corresponding Italian dish—polenta—often state that the mixture should be constantly stirred, and sometimes include the most careful and minute instructions about the character of the dish and spoon to be used, and other details. The fact is that these precautions are seldom necessary, for if corn meal and cold water are brought together without being stirred and the mixture is heated gradually and gently it does not lump. The most convenient utensil for the purpose is a bouble boiler, but the cooking can be done satisfactorily over the fire, providing the temperature is kept low. The elaborate directions usually given in the cookbooks appear to be quite unnecessary, and there seems to be no reason for running the risk of making the porridge lumpy by pouring the meal into hot water.

Nor is there any reason for having the mush stick to the dish and thus complicate the work of dish washing, as it does when the meal is cooked for a long time in a dish without water under it. If cooking over hot water is not thought to insure sterilization of the meal, the mush can be boiled after it has been cooked in the double boiler for a short time and the danger of lumping has passed.

Corn-Meal Mush Recipe

1 cup corn meal	3½ cups water or
1 teaspoon salt	4 cups milk or milk and water

Put all the ingredients into a double boiler and cook for 4 hours.

Mush in a Fireless Cooker

1 cup meal	4½ cups water, milk, or milk
1 teaspoon salt	and water

Mix the ingredients and bring them to the boiling point. Place the pail in the cooker and leave for from 5 to 10 hours. If the pail holding the mush is set into another pail of hot water before being placed in the cooker, the heat will be retained better, but whether this is necessary or not depends on the efficiency of the cooker.

Because of the long cooking which corn meal requires, it is often convenient to prepare it in a fireless cooker. It is, in fact, peculiarly adapted for this method of preparation, for, like all finely divided foods which are cooked in water, it can easily be brought to a uniformly high temperature, and there is no danger, as there is in cooking large pieces of meat, for example, that some parts will be cool when the food is put into the cooker. The large amount of water with which it is combined is also of advantage, for water has a very high specific heat, and for this reason cools off comparatively slowly. In cooking corn meal in the fireless cooker, 5 hours at least should be allowed.

Polenta. This dish, which is common in Italy, differs little, except in name, from hasty pudding, though it is served in very different ways. Sometimes cheese is added during the cooking. Polenta is often reheated either with tomato sauce, or a meat gravy left over from a meal or with a meat gravy made from a small amount of meat bought for the purpose, or with half tomato sauce and half meat gravy. In any case, the dish is improved by sprinkling each layer of polenta with cheese. When the polenta is to be reheated in gravy, it is well to cut it into small pieces in order that the gravy may be well distributed through the dish.

Tomato Sauce for Polenta

2 tablespoons butter
2 tablespoons flour
1 cup thick strained tomato juice
Salt and Pepper

Melt the butter; cook the flour thoroughly in it; add the tomato juice and seasonings; and cook until smooth, stirring constantly.

Savory Sauce for Polenta. Take 2 ounces of salt pork, bacon, or sausage. If bacon or pork is used, cut it into small pieces. Heat until crisp but not burned. In the fat which tries out of the meat, cook a small amount of finely chopped onion and red or green pepper, being careful not to burn them. Add 1 cup of thick tomato juice or a larger amount of uncooked juice, and cook the mixture until it is reduced to a smaller amount. Season with salt. To this sauce capers, mushrooms, or finely chopped pickle may be added.

Fried Corn-Meal Mush. The custom of packing hasty pudding in granite pans, cutting it into slices, and frying it, is too common to call for special mention here. A less common method in this country is that employed in Italy where polenta is usually spread out in thin layers on a board and cut into small blocks. These blocks are egged

and crumbed, and fried in deep fat. Another method is to mix corn meal in three times its volume of water and to cook it in water only long enough to form a mush, and to complete the cooking by frying the meal in butter or other fat. This is not so stiff as ordinary fried corn-meal mush, and has the advantage of requiring a shorter time for its preparation, as the temperature of fat suitable for frying is far greater than that of boiling water.

Roast Pork or Fried Chicken with Mush.—Blocks of fried corn-meal mush are sometimes served with roast pork, and are a common accompaniment of fried chicken, particularly in the Southern States. The mush is made by the usual method, is cooled and cut into slices and fried a delicate brown either in a greased pan or in deep fat.

Roast Pork with Batter Pudding.—A dish corresponding to the Yorkshire pudding which is frequently served with roast beef can be made out of corn meal to serve with roast pork.

One-fourth cup corn meal
1 cup milk
One-half teaspoon salt
2 eggs

Place the milk, corn meal, and salt in the top of a double boiler and cook them about 10 minutes, or until the meal has expanded to form a homogeneous mixture. After the mixture has cooled, add the eggs well beaten. Grease gem tins thoroughly, allowing to each about 1 teaspoon of fat from the roast pork. Bake in a moderate oven, basting occasionally with the drippings of the pork.

Corn-Meal Mush with Fruit.—Corn-meal mush is often served with dried fruits, particularly with figs and dates. In preparing such fruit for use with the mush, it is usually necessary to soften it. This can easily be accomplished by washing the fruit and then heating it in a slow oven. As a result of the heat the water remaining on the fruit is absorbed and the fruit softened and also dried on the surface.

Corn-Meal Mush with Cheese.—For this dish yellow corn

meal is usually used. For a mush made with 1 cup of yellow corn meal the usual allowance is one-half cup, or 2 ounces, of grated cheese. There is, however, no limit to the amount of cheese which can be added, and the addition of the cheese tends not only to make a more highly nitrogenous and nourishing dish, but also to make a dish which can be eaten without the addition of butter or cream. Like the ordinary corn-meal mush, it is often fried either in deep fat, after having been egged and crumbed, or in a small amount of fat.

Buttermilk Corn-Meal Mush.—White corn-meal cooked in buttermilk makes a dish which resembles cottage cheese in flavor. It may be eaten hot, but is especially palatable when served very cold with cream. For this purpose it is sometimes moulded in cups. In making it, allow 1 part of corn meal to 6 parts of buttermilk, and 1 teaspoon of salt to each cup of meal.

Baked Corn-Meal Mush.—When corn-meal mush is partly done pour it into shallow pans, making a layer not more than 2 inches thick, and cook in an oven until it is well browned. The product secured is very similar to the original "Johnny cake," which seems to have been simply a corn-meal mush cooked in the oven, or, in some localities, fried. The name, however, has with time come to be applied to a very large variety of corn breads.

Corn-Meal Dumplings

2 cups corn meal	Boiling water
1 teaspoon salt	Flour for dredging

Mix the meal and salt; pour boiling water over the meal and stir thoroughly, using water enough to make a thick paste. Form portions of the paste into flat dumplings about 3 inches in diameter. Have ready a kettle of boiling water and drop the dumplings in carefully, cover, and cook 20 minutes. These dumplings are often cooked with

turnip tops or other greens, with or without the addition of a ham bone or a piece of fat pork. Some cooks dredge the dumplings with flour before boiling them.

Corn Meal and Meat Dishes

There are a number of dishes made from corn meal and meat or fish, in which mush is used, or which resemble mush in some particulars. Recipes for such dishes follow:

Corn-Meal Mush with Pork

1 pound lean pork, part meat and part bone
1 cup corn meal
1 teaspoon salt
One-half teaspoonful powdered sage
Water

Cook the pork in water until the meat can be easily removed from the bone. Remove the meat, cool the broth, and remove the fat. Reduce the broth to about a quart, or add water enough to bring it up to this amount, and cook the corn meal in it. Add the meat finely chopped and the seasonings. Pack in granite bread tins. Cut into slices and fry. Beef may be used in the same way.

Corn-Meal Scrapple

1 pig's head split in halves
2 cups corn meal
Salt and sage

Follow the above directions for cooking corn meal with pork, but use double the amount of water.

Corn-Meal Fish Balls

2 cups cold white corn meal mush
1 cup shredded codfish
1 egg
1 tablespoon butter

Pick over the codfish and soak it to remove salt, if necessary. Combine the ingredients and drop by spoonfuls into hot fat. Drain on porous paper. These codfish balls

compare very favorably in taste with those made with potato and are more easily and quickly prepared.

Chicken and Corn-Meal Croquettes

1 cup white corn meal mush
1 cup chopped chicken
Few drops onion juice
1 egg
Salt and pepper

Combine the ingredients and drop by spoonfuls into hot fat.

White corn meal may be very satisfactorily combined with other kinds of cold meat to make croquettes. In general, corn meal croquettes need not be egged and crumbed like ordinary croquettes, for the hardening of the corn meal on the surface of the mixture forms the necessary crust.

Tamales

Meat from ½ boiled chicken
1 clove garlic or ½ medium-sized onion
¼ teaspoon cayenne
1 teaspoon salt
1 cup corn meal
2 or 3 small red peppers
Corn husks

Chop the chicken; season with the cayenne pepper, garlic, or the onion finely chopped, and salt; form the meat into little rolls about 2 inches long and three-fourths inch in diameter. Pour boiling water over the meal and stir; use water enough to make a thick paste. Take a heaping tablespoon of the paste, pat it out flat, and wrap a roll of chicken in it; then wrap each roll, as made, in corn husks which have been softened by immersion in hot water, tying the husks with a piece of string close to each end of the roll. Trim off the ends of the corn husks, allowing them to project an inch or two beyond the rolls. Cover the rolls with the broth in which the chicken was cooked, or with boiling salted water. Add two or three small, sharp, red peppers, and boil for 15 minutes.

Tamales are usually made with chicken but other meat may be used if desired.

Ash Cake

1 quart corn meal
2 teaspoons salt
1 tablespoon lard or other shortening
Boiling water

Scald the meal; add the salt and shortening, and when the mixture is cool form it into oblong cakes, adding more water if necessary. Wrap the cakes in cabbage leaves, or place one cabbage leaf under the cakes and one over them, and cover them with hot ashes.

Hoecake.—Hoecakes are made out of corn meal, water, and salt. They were originally baked before an open fire on a board which for convenience had a long handle attached to it. At present they are cooked slowly and on both sides on a well greased griddle.

Corn Dodger.—The corn dodger is like the hoecake except it usually contains a small amount of butter or lard. The meal is scalded and when cool is formed into cakes and cooked in a hot oven.

Crackling Bread

1 quart corn meal
1 pint cracklings
2 teaspoons salt
Boiling water

Mix the corn meal and salt; pour over this mixture enough boiling water to moisten but not enough to make a mush. When the meal has cooled, work the cracklings into it with the fingers. Form the dough into cakes about 4 inches long, 2 inches wide, and 1 inch thick; bake for 30 minutes. This bread, because of its large percentage of fat, is eaten without butter, and should be served very hot.

"Cracklings," like "scraps," is a name given to the crisp brown meat tissue left after lard is "tried out." Cracklings consist of connective tissue with a large amount of fat adhering to it. Much of the fat can be removed by presssure. This is best done by squeezing them in a thin cloth while they are still warm or after they have been reheated.

Crisp Corn-Meal Cake

1 cup milk
One-half cup white corn meal
One-half teaspoon salt

Mix the ingredients and heat slowly until the boiling point is reached. It is not necessary to stir. Spread on a shallow buttered pan to a depth of about one-fourth of an inch. Bake in a moderate oven until crisp.

Parched Corn-Meal Biscuits

1 cup yellow corn meal
2 teaspoons salt
2 cups peanut cream

Put the meal into a shallow pan and heat in the oven until it is a delicate brown, stirring frequently. Make the nut cream by mixing peanut butter with cold water and heating. It should be the consistency of thick cream. While the nut cream is hot, stir in the corn meal, which should also be hot. Beat thoroughly. The mixture should be of such consistency that it can be dropped from a spoon. Bake in small cakes on a greased pan.

If preferred, these biscuits may be made with cream or with butter in place of peanut cream, and chopped raisins may be added, 1 cup being the allowance for the quantities given above.

Beaten Corn Bread

Three -fourths cup white corn meal
Three-fourths cup wheat flour
1 teaspoon sugar
One-half teaspoon salt
1 tablespoon lard
Water

Mix and sift the dry ingredients and rub the lard thoroughly into the mixture by means of a fork. Add a little water, enough to moisten the mixture throughout, but not too much, as it must be crumbly. Spread on a board and beat thoroughly with a rolling pin or mallet, as is done with beaten biscuits, folding it over frequently to introduce air. Roll out about one-half inch thick, cut into small pieces, and bake in a moderate oven. In camp this can be baked in a hot greased pan propped up before a hot fire.

Sour-Milk Corn Bread

2 cups corn meal
2 cups sour milk
2 tablespoons butter
2 tablespoons sugar, white or brown
1½ teaspoons salt
2 eggs
1 teaspoon soda
1 tablespoon cold water

There are two ways of mixing this bread. By the first the meal, milk, salt, butter, and sugar are cooked in a double boiler for about 10 minutes. When the mixture is cooled, the eggs are added well beaten and the soda dissolved in the water. By the other method all the dry ingredients, including the soda, are mixed together, and then the sour milk and eggs well beaten and the butter are added. If the second method is followed, the cold water is not needed. The bread should be baked in a shallow iron or granite pan for about 30 minutes.

Since the bread made by the first method is of much better texture, that method is to be preferred, except in cases where there is not time for the necessary heating and cooling of the meal.

Buttermilk may be substituted for the sour milk, in which case the butter should be slightly increased; or sour cream may be used and the butter omitted.

Spider Corn Bread

1½ cups corn meal
2 cups sour milk
1 teaspoon soda
1 teaspoon salt
2 eggs
2 tablespoons butter

Mix the dry ingredients. Add the eggs well beaten and the milk. Place the butter in a frying pan, melt it, and grease the pan well. Heat the pan and turn in the mixture. Place in a hot oven and cook 20 minutes.

Zuñi Indian Bread

1 cup white corn meal
1 cup yellow corn meal
1 cup water
1 teaspoon salt
⅛ teaspoon cayenne
1 cup chopped suet

Mix all well together; form into rolls about 5 inches long; roll in greased paper; and bake in a moderate oven 1 hour. Serve hot.

The habit among the Indians was to roll these cakes in the husks of the corn, a method which is sometimes followed by campers.

Corn-Meal Muffins

½ cup corn meal
1 cup flour
3 teaspoons baking powder
2 tablespoons sugar
1 tablespoon melted butter
1 teaspoon salt
¾ cup milk
1 egg

Mix and sift the dry ingredients; add the milk gradually, the egg well beaten, and the melted butter; bake in a hot oven in buttered gem pans 25 minutes.

Corn Muffins with Dates

1 cup white corn meal
2 tablespoons brown sugar
1 teaspoon salt
2 tablespoons butter
1¼ cups milk
1 cup wheat flour
4 teaspoons baking powder
1 egg
½ cup dates cut into small pieces

Cook together the first 5 ingredients for 10 minutes in a double boiler. When cool, add the eggs, the dates, and the flour sifted with the baking powder. Beat thoroughly and bake in muffin pans in a quick oven, or bake in a loaf. The bread will keep in good condition longer if the dates are cooked with the corn meal and other ingredients in the double boiler.

Custard Corn Cake

2 eggs
¼ cup sugar
1 teaspoon soda
1 teaspoon salt
1 cup sour milk
1 cup sweet milk
1⅔ cups corn meal
⅓ cup wheat flour
2 tablespoons butter
1 cup cream

Beat the eggs and sugar together thoroughly. Sift the flour, soda, and salt together and mix with the meal. Mix all the ingredients but the cream and butter. Melt the butter in a deep pan, using plenty on the sides. Pour in the batter, add (without stirring) a cup of cream, and bake 20 to 30 minutes. When cooked there should be a layer of custard on top of the cake or small bits of custard distributed through it.

Corn-meal Rolls

1¼ cups wheat flour
¾ cup corn meal
3 teaspoons baking powder
2 tablespoons butter
1 egg
½ cup milk
1 teaspoon salt

Sift together the flour, baking powder, and salt, and mix with the meal. Rub the butter into the dry ingredients. Beat the egg, add the milk, and add this mixture to the dry ingredients. Add more milk if necessary to make a soft dough. Roll out on a floured board, handling lightly. Cut with a round biscuit cutter, fold like Parker House rolls, and bake in a quick oven.

Soft Corn Bread

⅔ cup rice
½ cup white corn meal
3 cups milk or milk and water mixed
2 or 3 eggs
2 tablespoons butter
1 teaspoon salt

Mix the rice, meal, and salt with the milk in the top of a double boiler, and cook until the rice is nearly soft. Add the butter and the eggs well beaten and transfer to a greased granite baking pan. Bake in a moderate oven for an hour. Serve in the dish in which it is baked.

Spoon Corn Bread

2 cups water
1 cup milk
1 cup white corn meal
1 tablespoon butter
2 eggs
2 teaspoons salt

Mix the water and the corn meal and bring slowly to the boiling point and cook 5 minutes. Add the eggs well beaten and the other ingredients. Beat thoroughly and bake in a well-greased pan for 25 minutes in a hot oven. Serve from the same dish with a spoon.

Delicate Spoon Corn Bread

¼ cup corn meal
1 teaspoon butter
1 tablespoon sugar
1 teaspoon salt
2 eggs
2 cups milk

Mix the corn meal and water and bring slowly to the boiling point and cook a few minutes. Add the butter sugar, salt, and yolks of eggs. Lastly, fold in the whites of eggs beaten stiff. Bake in a hot oven 30 minutes. Serve in the dish in which it is cooked.

Corn Meal and Hominy Bread

1 cup cooked hominy
1 cup milk
1 tablespoon melted butter
1 cup white corn meal
2 eggs
1½ teaspoons salt

Mix the ingredients and bake 30 minutes in a moderate oven.

Steamed Corn-Meal Bread

2 cups yellow meal
1 cup flour
2¼ cups sour milk
1½ teaspoons soda
1 teaspoon salt
½ cup molasses

Sift together the flour, soda, and salt, and stir in the corn meal, mixing thoroughly. Add the molasses and sour milk. Pour into a well-buttered mold, which should not be more than two-thirds full. A lard pail is a good substitute for the mold. Cover closely and steam 5 hours.

Boston Brown Bread

1 cup corn meal
1 cup rye meal
1 cup Graham flour
2½ teaspoons soda
1 teaspoon salt
¾ cup molasses
2 cups sour milk, or
1¾ cups sweet milk

Mix and sift the dry ingredients and add the molasses and milk. Beat thoroughly and steam 3½ hours in well-buttered, covered molds. Remove the covers and bake the bread long enough to dry the top.

This may be made also with 1½ cups corn meal and rye meal and no Graham flour.

Boston Brown Bread with Fruit.— Follow recipe for Boston brown bread, adding to the dry ingredients a cup of seeded and shredded raisins or prunes or a cup of Zante currants.

Boston Brown Bread with Cream

1 cup rye meal
1 cup corn meal
1 teaspoon salt
½ cup molasses
2 eggs
1½ cups thin cream

Sift the dry ingredients. Add molasses, yolks of eggs well beaten, and cream; lastly, fold in the whites of eggs beaten stiff. Pour mixture into buttered mold, steam 3 hours; then bake 1 hour in a moderate oven.

Indian Meal Bread

1½ cups Graham flour
1 cup corn meal
½ tablespoon soda
1 teaspoon salt
½ cup molasses
1⅔ cups milk

Mix and steam as Boston brown bread.

Apple Corn Bread

2 cups white corn meal
2 tablespoons sugar
½ teaspoon salt
1 teaspoon soda
1 teaspoon cream of tartar
1⅔ cups milk
3 tart apples pared and sliced

Mix the dry ingredients, add milk, and beat thoroughly Add the apples. Pour into a well-buttered shallow pan and bake 30 minutes in hot oven.

South Carolina Corn Bread

1½ quarts fine corn meal
2½ quarts wheat flour or
2½ quarts fine corn meal
1½ quarts wheat flour
2 teaspoons salt
1 pint mashed sweet potatoes
1 cake yeast

Mix 1 pint each of the corn meal and the flour and add warm water enough to form a stiff batter. Add the yeast cake, mixed with a small amount of water. Keep this sponge in a warm place until it becomes light. Scald the meal with boiling water and as soon as it is cool enough add it to the sponge with the flour, potatoes, and salt. The dough should be just thick enough to knead without danger of its sticking to the board. Experience will teach how much water to use to secure this end. Knead well and put in a warm place to rise. When it is light, form into loaves, put into bread pans, and let it rise until its volume is doubled. Bake in a moderate oven.

It was a common, though not general, practice in New England to add cooked pumpkin to the other ingredients in making such bread as this, very much as sweet potato is used in the South. The sweet potato or pumpkin changes

the flavor of the bread somewhat and apparently facilitates the rising of the dough, improves the texture of the bread, and tends to keep it moist. However, if sweet potato or pumpkin, either home cooked or canned, can not be conveniently obtained, good bread can be made without it.

Gluten and Corn Bread

- 2¼ cups yellow or white corn meal
- ¾ cup gluten, rye, or wheat flour (preference being in order named)
- 1½ cups boiling water
- 1 tablespoon sugar
- ½ yeast cake (or 1 cake if haste is an object) dissolved in ¼ cup lukewarm water.
- 2 tablespoons butter, lard, or a mixture of the two.
- 3 teaspoons salt.

Pour the corn meal into a dish of boiling water. It is not sufficient merely to pour the boiling water over the meal in a cold dish. If yellow meal is used, heat it a little in addition to pouring it into the boiling water, or mix meal and and water and heat in a double boiler. When cool mix with the other ingredients and knead thoroughly. Place in a baking tin, and bake when risen sufficiently.

Third Bread

- 2 quarts yellow corn meal
- 2 teaspoons salt
- Boiling water
- ½ cup molasses
- 1 quart rye flour
- 1 yeast cake

Mix the corn meal and salt and pour over them enough boiling water to moisten the mixture but not to make a batter. When cool add the molasses and the yeast mixed with a little water. Add the rye flour to the corn meal mixture, gradually alternating it, if necessary, with lukewarm water in order to keep the dough thin enough to be stirred with a spoon. Let it rise until light, form into a loaf, and bake in a slow oven four or five hours.

Corn Meal Puffs, Griddlecakes, and Waffles

The peculiar granular consistency of corn meal, which is a disadvantage under some circumstances, is an advantage in making griddlecakes or waffles, for it renders them very tender.

Corn Meal Puffs

1 quart milk
⅔ cup corn meal
¼ cup sugar
1 teaspoon salt
8 eggs
Grated nutmeg (if desired)

Cook the milk and meal together 15 minutes with the salt and sugar. When cool add the eggs well beaten. Bake in cups. Serve with stewed fruit or jam.

By increasing the corn meal in the above recipe by half (i.e., to 1 cup) the batter is made stiff enough to be dropped into hot fat and fried.

Corn Meal Pancakes

2 cups flour
½ cup corn meal
1½ tablespoons baking powder
1½ teaspoons salt
⅓ cup sugar
1½ cups boiling water
1¼ cups milk
1 egg

Add meal to boiling water and boil 5 minutes; turn into bowl, add milk and remaining dry ingredients mixed and sifted, then the egg well beaten, and butter. Cook on a greased griddle.

Corn Meal and Wheat Waffles.

1½ cups water
½ cup white corn meal
1½ cups milk
3 cups flour
3 tablespoons sugar
1¼ tablespoons baking powder
1½ teaspoons salt
Yolks 2 eggs
Whites 2 eggs
2 tablespoons melted butter

Cook the meal in boiling water 20 minutes; add milk, dry ingredients mixed and sifted, yolks of eggs well beaten,

butter and whites of eggs beaten stiff. Cook on a greased waffle iron.

Corn Meal and Rice Waffles

½ cup corn meal
½ cup flour
1 cup boiled rice
2 eggs well beaten
1 tablespoon melted butter
½ teaspoon soda
1 teaspoon salt
1 cup sour milk

Sift together the flour, soda, and salt. Add the other ingredients and beat thoroughly.

Buttermilk Waffles

3 cups water
2 cups corn meal
2 cups wheat flour
1 cup sweet milk
4 eggs
2 tablespoons butter
2 teaspoons salt
1½ teaspoons soda
Buttermilk or sour milk enough to make a thin batter

Cook the meal, water, salt, and butter together in a double boiler for 10 minutes. When the mush is cool add the eggs, beaten separately until very light. Sift the flour and soda together. Add the flour and the sweet milk alternately to the corn mixture. Finally add the buttermilk. This mixture is improved by standing a short time.

Corn Meal Puddings

There is a large variety of popular and very nutritious puddings made chiefly out of milk, to which a small amount of some starchy substance has been added. The substance most frequently used is probably rice, but corn meal too has always been commonly used.

The proportion of cereal to milk is always as low as 1 to 12, and sometimes as low as 1 to 16; i.e., one-fourth to one-third cup of cereal to 3 or 4 cups of milk. The only other ingredients are sugar or molasses and some flavoring material. Other puddings are made by combining corn meal with milk and eggs.

Indian Pudding

5 cups milk
⅓ cup corn meal
½ cup molasses
1 teaspoon salt
1 teaspoon ginger

Cook milk and meal in a double boiler 20 minutes; add molasses, salt, and ginger; pour into buttered pudding dish and bake 2 hours in slow oven; serve with cream.

Corn Meal and Fig Pudding

1 cup corn meal
1 cup molasses
6 cups milk (or 4 of milk and 2 of cream).
1 cup finely chopped figs
2 eggs
1 teaspoon salt

Cook the corn meal with 4 cups of the milk, add the figs and salt. When the mixture is cool, add the eggs well beaten. Pour into a buttered pudding dish and bake in a moderate oven for three hours or more. When partly cooked add the remainder of the milk without stirring the pudding.

Corn Meal and Apple Pudding.—For the figs in the above recipe substitute a pint of finely sliced or chopped sweet apples.

Boiled Corn Meal and Apple Dumpling

6 tart apples, medium-sized
1 teaspoon salt
2 cups corn meal
Boiling water

Pour boiling water over the corn meal, to which the salt has been added, using enough water to make a thick paste; stir thoroughly; with the hands flatten out the paste until it is about 1 inch thick and wrap it around the apples, which have been pared, cored, and quartered. Inclose in a pudding cloth and cook in boiling salted water. If preferred, the pudding may be put in a bowl, covered with a plate, and steamed.

This is an old-fashioned dish which was commonly served as an accompaniment to roast pork.

This pudding may be used as a dessert by cutting it open

before serving, scattering sugar and bits of butter over it and then a little cinnamon or grated nutmeg. Cream or any of the usual pudding sauces may be served with it if desired.

Corn Meal Cakes

It is often possible to substitute corn meal for part of the flour in making cakes. In some of the cases given here, in making gingerbread, for example, there is no special advantage in using it, but it is well to know that it can be used in emergencies. In making doughnuts, however, there is a decided advantage in substituting corn meal for part of the flour, for doughnuts so made are much more likely to be tender than those made with wheat flour alone.

Indian-Meal Doughnuts

¾ cup milk
1½ cups very fine white corn meal
1¼ cups wheat flour
¼ cup butter
¾ cup sugar
2 eggs well beaten
1 teaspoon cinnamon
2 teaspoons baking powder
1 level teaspoon salt

Put milk and meal into a double boiler and heat together for about 10 minutes. Add the butter and sugar to the meal. Sift together the wheat flour, baking powder, cinnamon, and salt. Add these and the eggs to the meal. Roll out on a well-floured board; cut into the desired shapes; fry in deep fat; drain and roll in powdered sugar.

Molasses Corn Cake

2 cups yellow corn meal
½ cup molasses
½ cup sugar
2 tablespoons butter
1 teaspoon salt
1 cup sour milk
1 cup sweet milk
1 cup wheat flour
1½ teaspoons soda
1 egg

Mix the first seven ingredients in a double boiler and cook

over hot water. Cook for about 10 minutes after the mixture has become hot. After it has cooled add the wheat flour and soda, thoroughly sifted together, and the egg well beaten. Bake in a shallow tin.

Corn Meal Gingerbread.—To the above recipe add one-half teaspoon ginger, 1 teaspoon cinnamon, and one-half teaspoon cloves, sifting them with the flour.

Corn Meal and Orange Gingerbread.—To the recipe for gingerbread given above add the grated rind of an orange or one-half cup of orange marmalade. If the latter is added, the amount of milk and of sugar should both be slightly reduced.

Fruit Gems

1 cup corn meal
1 cup milk
1 teaspoon salt
1 teaspoon baking powder
½ cup raisins
½ cup Zante currants
½ cup cream

Cook the meal and salt in the milk for a few minutes. When cool add the baking powder and beat thoroughly. Add the fruit and cream and bake in well-buttered muffin tins.

*Low Cost Meals

The following menus are not suitable as they stand for all classes of people, but they form a wholesome diet for the average active individual. For sedentary people they should be modified and taken in small quantities. This can be done either by spending less or decreasing the amount of fuel food used and including more fruit and green vegetables.

*NOTE.—The following menus and tables we have taken the liberty of re-printing from the pamphlet "Food" by Dr. Eugene Lyman Fisk, of the Life Extension Institute. On this bill of fare a squad of stalwart New York policemen were kept well nourished in the month of January, 1917, at a cost of twenty-five cents a day per man.

More eggs and milk are needed for children, and if possible, more fruit and green vegetables, but for them the fuel food must be kept high.

Tea and coffee were included as concessions to former habits of those who volunteered to take the diet experiment, but are not advised as regular indulgences.

Tuesday, Jan. 9

Breakfast—Oatmeal with milk, toast and nut margarine, coffee.

Luncheon—Baked macaroni and cheese, corn bread, nut margarine, tea.

Dinner—Meat loaf with French fried potatoes, Graham bread, nut margarine, date pudding with sauce, tea.

Wednesday, Jan. 10

Breakfast—Hominy, bananas, milk, roll, nut margarine and coffee.

Luncheon—Baked beans, salt pork, brown bread, nut margarine and tea.

Dinner—Goulash, steamed rice, hot biscuit, nut margarine, apple pie and tea.

Thursday, Jan. 11

Breakfast—Oatmeal and milk, toast with nut margarine, coffee, milk.

Luncheon—Split pea soup with croutons, raisin bread with nut margarine, tea.

Dinner—Roast beef heart stuffed with carrots and onions, whole wheat bread, nut margarine, cornstarch pudding and milk, tea.

Friday, Jan. 12

Breakfast—Fried mush, syrup, rolls, nut margarine, coffee, milk.

Luncheon—Savory rice, currant rolls, nut margarine, tea, milk.

Dinner—Baked stuffed, haddock, scalloped potatoes, Graham bread, nut margarine, fruit pudding with clear sauce, tea.

Saturday, Jan. 13

Breakfast—Hominy, milk, toast and nut margarine, coffee.

Luncheon—Baked bean soup, French toast, nut margarine and tea.

Dinner—Kidney stew, baked potatoes, whole wheat bread, nut margarine, stewed prunes, molasses cookies, tea.

Sunday, Jan. 14

Breakfast—Oatmeal and milk, pancakes, nut margarine and syrup, coffee.

Dinner—Roast pork with apple sauce, samp, wheat bread and nut margarine, apricot-tapioca pudding, tea.

Supper—Corn chowder, Graham bread with nut margarine tea.

Monday, Jan. 15

Breakfast—Oatmeal and milk, rolls and nut margarine, coffee.

Luncheon—Meat soup with barley, currant bread and nut margarine, tea.

Dinner—Beef stew with dumplings, mashed turnips, rye bread and nut margarine, baked rice pudding with raisins, tea.

Tuesday, Jan. 16

Breakfast—Hominy and milk, Graham toast and nut margarine, coffee.

Luncheon—Scalloped onions and peanuts, hot buns and nut margarine, oatmeal cookies, tea.

Dinner—Mock chicken with tomato sauce, carrots, whole wheat bread and nut margarine, chocolate blanc mange, tea.

Wednesday, Jan. 17

Breakfast—Oatmeal with milk, Graham muffins and nut margarine, coffee.

Luncheon—Stewed lima beans, oat bread with nut margarine, tea.

Dinner—Creamed codfish, baked potato, whole wheat bread with nut margarine, Norwegian prune pudding, tea.

Thursday, Jan. 18

Breakfast—Fried hominy and syrup, rolls and nut margarine, coffee.

Luncheon—Spaghetti and cheese, pickled beets, cinnamon rolls with nut margarine, tea.

Dinner—Corned beef and cabbage, carrots, Graham bread and nut margarine, mock cherry pie, tea.

Friday, Jan. 19

Breakfast—Oatmeal with milk, toast with nut margarine, coffee.

Luncheon—Salmon croquettes with peas, date bread and nut margarine, tea.

Dinner—Baked split peas, stuffed green peppers, whole wheat bread and nut margarine, sliced oranges and bananas, tea.

Saturday, Jan. 20

Breakfast—Hominy and milk, toast with nut margarine, coffee.

Luncheon—Welsh rarebit on toast, scalloped tomatoes, hot biscuit, nut margarine, tea.

Dinner—Corned beef hash with vegetables, Graham bread, nut margarine, Brown Betty with hard sauce, tea.

Sunday, Jan. 21

Breakfast—Oatmeal and milk, corn griddle cakes, syrup and nut margarine, coffee.

Dinner—Rolled steak, Graham bread and nut margarine, mashed sweet potatoes, chocolate ice cream, tea.

Supper—Creamed oysters on toast, Parker House rolls, nut margarine, stewed peaches and raisins, tea.

Monday Jan. 22

Breakfast—Hominy and milk, Graham toast and nut margarine, coffee.

Luncheon—Scalloped rice and tomatoes, corn muffins and nut margarine, apple dumplings and hard sauce, tea.

Dinner—Hamburger steak, Lyonnaise potatoes, whole wheat bread and nut margarine, cottage pudding with clear sauce, tea.

Tuesday, Jan. 23

Breakfast—Oatmeal and milk, crullers, rolls and nut margarine, coffee.

Luncheon—Potato soup with carrots, rye bread and nut margarine, stewed prunes, ginger snaps, tea.

Dinner—Parsnips baked with sausage, samp, whole wheat bread with nut margarine, bread pudding, fruit sauce, tea.

Wednesday, Jan. 24

Breakfast—Hominy with milk, toast with nut margarine, coffee.

Luncheon—Baked lima beans, Boston brown bread and nut margarine, sliced oranges and bananas with shredded cocoanut, tea.

Dinner—Liver and bacon, creamed potatoes, whole wheat bread and nut margarine, coffee jelly, tea.

Thursday, Jan. 25

Breakfast—Oatmeal and milk, toast and nut margarine, coffee.

Luncheon—Macaroni croquettes with tomato sauce, Graham bread, and nut margarine, cornstarch pudding with with raisin sauce, tea.

Dinner—Beef pot roast, carrots and onions, whole wheat bread and nut margarine, caramel tapioca, tea.

Friday, Jan. 26

Breakfast—Hominy and milk, toast with nut margarine, coffee.

Luncheon—Baked rice and cheese, raisin bread and nut margarine, apple sauce, tea.

Dinner—Scalloped salmon, German fried potatoes, Graham bread and nut margarine, prune pie, tea.

Saturday, Jan. 27

Breakfast—Oatmeal and milk, rolls and nut margarine, coffee.

Luncheon—Fried mush and syrup, white bread and nut margarine, stewed apricots, tea.

Dinner—Baked beans with salt pork, whole wheat bread and nut margarine, molasses cake, tea.

Sunday, Jan. 28

Breakfast—Oatmeal and milk, griddle cakes with nut margarine and syrup, coffee.

Dinner—Veal loaf and baked barley, Graham bread and nut margarine, pickled beets, lemon milk sherbet and vanilla wafers, tea.

Supper—Kidney bean stew, whole wheat bread and nut margarine, apple sauce, cake, tea.

Monday, Jan. 29

Breakfast—Hominy and milk, toast and nut margarine, coffee.

Luncheon—Split pea soup, toasted crackers, whole wheat bread and nut margarine, baked bananas, salted peanuts, tea.

Dinner—Codfish cakes with tomato sauce, Graham bread and nut margarine, fruit shortcake, tea.

The materials used in the preparation of these menus are listed in the tables which follow—first, in order of cost per pound; second in order of cost per hundred calories.

Cost Per Pound.

Vanilla	2.4000	Beef liver	.1200
Gelatine	1.9200	Beef heart	.1200
Nutmeg	1.6000	Peaches, dried	.1200
Sage	1.0400	Pork sausage	.1200
Mustard	.6800	Crackers, soda	.1100
Ginger	.5333	Cabbage	.1050
Pepper	.5200	Peas, canned	.1010
Cloves	.4800	Rye bread	.1000
Baking powder	.4200	Cranberries	.1000
Cinnamon	.4000	Spaghetti	.1000
Soda bicarbonate	.4000	Pork kidney	.1000
Chocolate	.3800	Suet	.1000
Tea	.3500	Corn, canned	.0960
Eggs (9 per lb.)	.3370	White bread	.0900
Yeast	.3200	Cornstarch	.0900
Cocoanut (shredded)	.3000	Tapioca	.0900
Cheese, American, pale	.2800	Graham bread	.0800
Nut margarine (Nucoa)	.2700	Brown sugar, average	.0760
Currants, dried	.2500	Granulated sugar, average	.0750
Oysters	.2400	Molasses	.0715
Codfish, salt	.2200	Onions	.0700
Salmon, canned	.2200	Parsnips	.0643
Bacon, average	.2130	Rolls, white	.0640
Coffee	.2000	Barley	.0600
Pork, salt	.2000	Beets	.0600
Pork, fresh average	.1948	Graham flour	.0600
Lamb	.1875	Rice, broken	.0600
Dates	.1860	Boston brown bread	.0500
Codfish, fresh	.1800	Carrots	.0500
Cream, 18.5%	.1700	White flour	.0500
Apricots, dried	.1700	Hominy	.0500
Peanuts	.1600	Pork, larding	.0500
Veal	.1600	Rolled oats	.0500
Beef, average	.1526	Potatoes, white	.0500
Raisins	.1516	Samp	.0500
Apples, dried	.1500	Corn meal	.0400
Kidney beans	.1400	Milk	.0400
Beef, corned	.1400	Vinegar	.0400
Peas, split	.1400	Oranges	.0320
White beans, dried	.1300	Bananas	.0320
Macaroni, average	.1300	Potatoes, sweet	.0300
Prunes	.1300	Turnips	.0311
Lima beans, dried	.1233	Salt	.0200
Tomatoes, canned	.1220	Rock salt	.0170
Haddock	.1200	Lemons, 12 for 12c.	
		Gr. Peppers, 12 for 15c.	

Cost per 100 Calories

The calory is a unit of heat or energy measurement, just as an inch is a unit of length measurement, or a pound a unit of weight, and represents the amount of heat required to raise one pound of water 4 degrees Fahrenheit.

During rest there is required about ½ to ¾ of a calory per hour per pound of body weight (assuming that a person is well proportioned and not fat). During exercise the requirement varies from 1 to 3 calories per hour per pound of body weight, according to the activity. The heavier the work the larger the number of calories required until the amount needed per day per man reaches 5,000 to 6,000 in those working all day at very hard muscular labor. This has been determined by actual experiment with people engaged at their work in a respiration calorimeter or specially devised room in which their heat consumption can be measured.

Cooked	Cost	Cooked	Cost
Cabbage	.0710	Chocolate Ice Cream	.0111
Boiled Onions	.0402	Potato Soup with Carrots	.0109
Carrots and Onions	.0330	Raisin Sauce	.0107
Carrots	.0295	Liver and Bacon	.0106
Baked Stuffed Haddock	.0261	Scalloped Salmon	.0105
Beef Pot Roast	.0228	Corn Chowder	.0105
Stuffed Green Peppers	.0212	Corned Beef Hash	.0101
Turnips and Potatoes (mashed)	.0211	Codfish Balls	.0100
Creamed Oysters	.0180	Creamed Codfish	.0099
Beets, pickled	.0179	Chocolate Blanc Mange	.0096
Kidney Stew	.0168	Scalloped Onions and Peanuts	.0094
Hamburg Steak	.0158	Stewed Peaches	.0092
White Sauce (for Salmon Croquettes)	.0153	Kidney Bean Stew	.0091
Veal Loaf	.0150	Scalloped Potatoes	.0089
Rolled Steak with Dressing	.0150	Apple Sauce	.0088
Baked Potatoes	.0148	Stewed Apricots	.0087
Beef Stew with Dumplings	.0147	Bread Pudding	.0087
Stuffed Beef Heart	.0142	Clear Sauce (for Cottage Pudding)	.0084
Sliced Oranges and Bananas, with Cocoanut	.0135	Spaghetti and Cheese	.0084
Roast Pork	.0127	Welsh Rarebit on Toast	.0082
Creamed Potatoes	.0119	Scalloped Tomatoes	.0080
Sliced Orange and Banana	.0117	Stewed Lima Beans	.0077
Lyonnaise Potatoes	.0115	Lemon Milk Sherbet	.0076
Parsnips (baked with sausage)	.0113	Split Pea Soup	.0076
Apples (dried) for sauce	.0112	Sauce (for Short Cake)	.0075
Prunes, stewed	.0111	Baked Beans with Salt Pork	.0074
Coffee Jelly	.0111	Mock Chicken	.0069
		Cornstarch Pudding	.0069

Cooked	Cost
Cottage Pudding	.0068
Rice Pudding with Raisins	.0068
Apricot Tapioca	.0067
Baked Split Peas	.0067
Graham Muffins	.0064
Cinnamon Rolls (Yeast)	.0064
Cornstarch Pudding	.0063
Brown Betty	.0062
Baked Lima Beans	.0061
Baked Rice and Cheese	.0059
Oatmeal Cookies	.0058
Molasses Cake	.0057
Apple Sauce Cake	.0056
German Fried Potatoes	.0056
Fruit Pudding	.0055
Clear Sauce (for Fruit Pudding)	.0054
Prune Pie	.0054
Apple Dumpling	.0054
Tapioca	.0053
Hard Sauce	.0052
Salmon Croquettes	.0051
Savory Rice	.0051
Vanilla Wafers	.0049
Currant Bread	.0049
Currant Rolls	.0046
Date Bread	.0046
Yellow Split Pea Soup	.0045
Mock Cherry Pie	.0045
Baking Powder Biscuits	.0045
Syrup for Corn Mush	.0044
Scalloped Rice and Tomatoes	.0044
Crullers	.0041
Oat Bread	.0040
Macaroni Croquettes	.0039
Raisin Bread	.0039
Baked Barley	.0037
Meat Soup with Barley	.0037
Pancakes	.0037
Baking Powder Short Cake	.0036
Corn Cakes	.0035
Corn Griddle Cakes	.0034
Parker House Rolls	.0034
Corn Muffins	.0032
Molasses Cookies	.0032
Samp	.0031
French Toast	.0029
Hominy (fried)	.0028
Ginger Snaps	.0026
Fried Cornmeal Mush	.0024

Note that the most expensive food served, that is, least energy for the money, was cabbage, 7c per 100 calories. The cheapest, corn meal mush, ¼c. per 100 calories.

Chapter *NINE*

Canning—Preserving—Drying—The Fireless Cooker

IN the preservation of foods by canning, preserving, etc., the most essential things in the processes are the sterilization of the food and all the utensils and the sealing of the sterilized food to exclude all germs.

The investigations of scientists, particularly of Pasteur, have shown that it is not the oxygen of the air which causes fermentation and putrefaction, but bacteria and other microscopic organisms.

Scientists have found that if food is perfectly sterilized and the opening of the jar or bottle plugged with sterilized cotton, food will not ferment, for the bacteria and yeasts to which such changes are due cannot pass through the cotton. This method cannot be conveniently followed with large jars.

Bacteria and yeasts exist in the air, in the soil, and on all vegetable and animal substances, and even in the living body, but although of such universal occurrence, the true

NOTE.—"Canned Fruits, Preserves and Jellies," by Maria Parloa, and "Drying Fruits and Vegetables in the Home" (both published in 1917 by the United States Department of Agriculture) and the before mentioned "Hints to Housewives," 1917, are the Editor's authorities for this Chapter.

knowledge of their nature and economic importance has only been gained during the last forty years.

There are a great many kinds of these micro-organisms. Some do great harm, but it is thought that the greater part of them are beneficial rather than injurious.

Yeasts and Bacteria

It has been estimated that one bacterium may give rise, within twenty-four hours, to seventeen millions of similar organisms. The favorable conditions for growth are moisture, warmth, and proper food.

Yeasts, which are also one-celled organisms, grow less rapidly. A bud develops, breaks off, and forms a new yeast plant. Some yeasts and some kinds of bacteria produce spores. Spores, like the dried seeds of plants, may retain their vitality for a long time, even when exposed to conditions which kill the parent organism.

Yeasts and nearly all bacteria require oxygen, but there are species of the latter that seem to grow equally well without it, so that the exclusion of air, which, of course, contains oxygen, is not always a protection, if one of the anaerobic bacteria, as the kinds are called which do not require oxygen, is sealed in the can.

Spoiling of food is caused by the development of bacteria or yeasts. Certain chemical changes are produced as shown by gases, odors, and flavors.

Bacteria grow luxuriantly in foods containing a good deal of nitrogenous material, if warmth and moisture are present. Among foods rich in nitrogenous substances are all kinds of meat, fish, eggs, peas, beans, lentils, milk, etc. These foods are difficult to preserve on account of the omnipresent bacteria. This is seen in warm, muggy weather, when fresh meat, fish, soups, milk, etc., spoil quickly. Bacteria do not develop in substances containing a large percentage of sugar, but they grow rapidly in a suitable wet substance

which contains a small percentage of sugar. Yeasts grow very readily in dilute solutions containing sugars in addition to some nitrogenous and mineral matters. Fruits are usually slightly acid, and in general do not support bacterial growth, and so it comes about that canned fruits are more commonly fermented by yeasts than by bacteria.

Some vegetable foods have so much acid and so little nitrogenous substance that very few bacteria or yeasts attack them. Lemons, cranberries, and rhubarb belong to this class.

Temperature is an important factor in the growth of bacteria and yeasts. There are many kinds of these organisms, and each kind grows best at a certain temperature, some at a very low one and others at one as high as 125° F., or more. However, most kinds of bacteria are destroyed if exposed for ten or fifteen minutes to the temperature of boiling water (212° F.); but, if the bacteria are spore producers, cooking must be continued for an hour or more to insure their complete destruction. Generally speaking, in order to kill the spores the temperature must be higher than that of boiling water, or the article to be preserved must be cooked for about two hours at a temperature of 212° F., or a shorter time at a higher temperature under pressure. Yeasts and their spores are, however, more easily destroyed by heat than bacteria spores. Hence, fruits containing little nitrogenous material are more easily protected from fermentation than nitrogenous foods in which in general fermentation is caused by bacteria. Of course, it is not possible to know what kinds of organisms are in the food one is about to can or bottle; but we do know that most fruits are not favorable to the growth of bacteria, and, as a rule, the yeasts which grow in fruits and fruit juice can be destroyed by cooking ten or fifteen minutes at a temperature of 212° F. If no living organisms are left, and the sterilization of all appliances has been thorough, there is no reason why the fruit, if properly sealed, should not keep with but slight change of texture or flavor, for a year or

longer, although canned fruits undergo gradual change and deterioration even under the most favorable conditions.

When fruit is preserved with a large amount of sugar (a pound of sugar to a pound of fruit) it does not need to be hermetically sealed to protect it from bacteria and yeasts, because the thick, sugary sirup formed is not favorable to their growth. However, the self-sealing jars are much better than keeping such fruit in large receptacles, from which it is taken as needed, because molds grow freely on moist, sugary substances exposed to the air.

Molds and Molding

Every housekeeper is familiar with molds which, under favorable conditions of warmth and moisture, grow upon almost any kind of organic material. This is seen in damp warm weather, when molds form in a short time on all sorts of starchy foods, such as boiled potatoes, bread, mush, etc., as well as fresh canned and preserved fruits.

Molds develop from spores which are always floating about in the air. When a spore falls upon a substance containing moisture and suitable food it sends out a fine thread, which branches and works its way over and into the attacked substance. In a short time spores are produced and the work of reproduction goes on.

Mold spores are very light and are blown about by the wind. They are a little heavier than air, and drop on shelves, tables, and floor, and are easily set in motion again by the movement of a brush, duster, etc. If one of these spores drops on a jar of preserves or a tumbler of jelly, it will germinate if there be warmth and moisture enough in the storeroom. Molds do not ordinarily cause fermentation of canned foods, although they are the common cause of the decay of raw fruits. They are not as injurious to canned goods as are bacteria and yeasts. They do not penetrate deeply into preserves or jellies, or into liquids or semiliquids, but if given time they

will, at ordinary room temperature, work all through suitable solid substances which contain moisture. Nearly every housekeeper has seen this in the molding of a loaf of bread or cake.

In the work of canning, preserving and jelly making it is important that the food shall be protected from the growth of molds as well as the growth of yeasts and bacteria.

To kill mold spores food must be exposed to a temperature of from 150° F. to 212° F. After this it should be kept in a cool, dry place and covered carefully that no floating spore can find lodgment on its surface.

Sterilization

To sterilize a substance or thing is to destroy all life and sources of life in and about it. In following the brief outline of the structure and work of bacteria, yeasts, and molds, it has been seen that damage to foods comes through the growth of these organisms on or in the food; also that if such organisms are exposed to a temperature of 212° F., life will be destroyed, but that spores and a few resisting bacteria are not destroyed at a temperature of 212° F., unless exposed to it for two or more hours.

Bacteria and yeasts, which are intimately mixed with food, are not as easily destroyed as are those on smooth surfaces, such as the utensils and jars employed in the preparation of the food.

Since air and water, as well as the foods, contain bacteria and yeasts, and may contain mold spores, all utensils used in the process of preserving foods are liable to be contaminated with these organisms. For this reason all appliances, as well as the food, must be sterilized.

Stewpans, spoons, strainers, etc., may be put on the fire in cold or boiling water and boiled ten or fifteen minutes. Tumblers, bottles, glass jars, and covers should be put in

cold water and heated gradually to the boiling point, and then boiled for ten or fifteen minutes. The jars must be taken one at a time from the boiling water at the moment they are to be filled with the boiling food. The work should be done in a well swept and dusted room, and the clothing of the workers and the towels used should be clean. The food to be sterilized should be perfectly sound and clean.

In canning fruits it is well to remember that the product is more satisfactory if heated gradually to the boiling point and then cooked the given time.

Canning Hints

One secret of success is cleanliness. For this reason, keep the room as free as possible from dust; keep the table, your hands, and your clothes clean while you work; and wash all the utensils just before beginning work; rinse them with boiling water, and let them dry without wiping.

To Sterilize Jars.—Put the jars in a pan or pail, cover with cold water, let it come to a boil and boil for ten minutes. This is an extra precaution, not necessary except when fruit is cooked before being put into jars. When it is done, covers and rings should be sterilized in a smaller vessel in the same way.

To Test a Jar.—Fill a jar with water, fasten on ring and cover, and invert. If it leaks, either the jar is imperfect of the rubber poor. Use no jar that cannot be made absolutely tight.

Causes of Breakage

1. Overpacking the jars. Corn, peas and lima beans swell or expand in canning. Do not fill the jars quite full of these products.

2. Placing the cold jars in hot water or vice versa. As soon as the jars are filled with hot syrup or hot water, place them immediately in the boiler.

3. Having the wire fastener of glass-top jars too tight, thus breaking the jars when the lever is forced down.

4. Allowing a cold draft to strike the jars when they are removed from the boiler.

When to Can.—Can each fruit in its season when it is best and cheapest. It is best for canning just before it is quite ripe. The better the condition of the fruit the easier it is to sterilize. So use only fresh, clean, sound fruit, and see that no soft berries or spoiled bits get into the cans.

To cook fruit in jars in a closed vessel the following outfit is necessary.—A wash boiler, pail, or any vessel with a tight-fitting cover, large enough to hold several jars; a rack to fit the bottom of the boiler and keep the jars from bumping and breaking when the water boils (this may be a piece of heavy wire netting or it may be made at home of strips of wood); quart or pint glass jars (the jars with glass covers and metal springs are best); a new rubber ring for each jar (old rubber may not be air-tight); large bowl or enamelled pan for fruit; plated knife and fork; plated or enamelled spoon; quart measure; half-pint measure; scales; saucepan for syrup. Avoid iron and tinware in canning.

Canning Fruits With Sugar

Pack fruit compactly in jars. It will pack better if put in a strainer or piece of cheese-cloth and lowered into boiling water for about one minute. This is called "blanching." Blanch fruit in small lots, that the water may not be cooled much. Press fruit gently down in jars with spoon or small wooden spatula. Fill jars with syrup. Release any air-bubbles by slipping knife or spatula down between fruit and jar. Put on rings and cover without fastening them down. Place jars on rack in boiler. Pour warm water in boiler, enough to come about half-way up the jars. Put cover on boiler. Bring water to a boil and boil *gently* as long as required. Remove boiler from the stove, fasten down cov-

ers, take jars out and let them cool. If, when jars are taken from the boiler, there is more than half an inch of space between fruit and cover, the contents of one jar may be used to fill the rest before the covers are fastened down. Put jars again in boiler and boil 5 minutes more.

These directions apply to fruit bought in towns and cities. Less time is required for fruit freshly picked. Ten minutes for quart jars, five minutes for pint jars of freshly picked berries is sufficient. The shorter the time of cooking, the better the berries retain their flavor, shape and color.

Fruits can be classified into three distinct groups or classes, such as soft fruits, sour berry fruits and hard fruits.

1. Soft fruits (*strawberries, blackberries, sweet cherries, blueberries, peaches, apricots, etc.*)

To Can Soft Fruits.—Make a syrup in the proportion of 1 cup of sugar to 3 cups of water. Put on stove and bring to the boiling point. For a thin syrup, boil one minute. For a medium-thin syrup, boil until slightly sticky when cooled. The amount of syrup required will depend upon the quantity of fruit to be canned. Rinse the fruit by pouring water over it through a strainer. Cull, seed, stem, and remove skins if necessary. Pack immediately in glass jars. Add boiling hot syrup. Fill jars to overflowing. Place rubbers and tops in place. Partially tighten. Place jars in kettle and boil *gently* for 10 to 20 minutes. Remove jars from kettle. Tighten covers. Invert to cool and test for leakage. Wrap glass jars in paper to prevent bleaching. Then store.

2. Sour berry fruits, such as currants, gooseberries, cranberries and sour cherries.

To Can Sour Berry Fruits.—Stem, hull and clean. Dip quickly in hot water. Remove and dip quickly in cold water. Pack berries closely in jars. Add a boiling hot syrup made in the proportion of 1½ cups of sugar to 3 cups of water. Place rubbers and caps in place. Partially tighten. Place jars in kettle and boil *gently* for 10 to 20

minutes. Remove jars. Tighten covers and invert to cool and test for leakage. Wrap in paper, and store.

3. Hard fruits, such as apples, pears, quinces, etc.

To Can Hard Fruit.—Dip quickly in hot water for 1½ minutes, and then plunge quickly in cold water. Core, pit, or remove skins if necessary. Pack whole, quartered, or sliced as desired. Add a boiling hot syrup made in the proportion of 1 cup of sugar to 3 cups of water. Place rubbers and tops in position. Partially tighten. Place jars in kettle and boil *gently* for 15 to 25 minutes. Remove jars. Tighten covers and invert to cool and test for leakage. Wrap glass jars in paper to prevent bleaching, and store.

Canning Fruits Without Sugar

Wash fruits; cull, seed, stem, and remove skins if necessary. Can whole or cut in halves. Pack fruit in jars and fill the jars to the top with cold water. Put rubbers and caps in place and partially tighten. Put jars in kettle and pour cold water into kettle, enough to come very near the top of the jars. Cover the kettle and bring slowly to boiling. Boil soft fruits from 30 to 45 minutes, until fruit is cooked through. Hard fruits will require an hour and a half.

Have only enough fire to keep the water boiling *gently*. More than this is a waste of either coal or gas, and the rapid boiling is likely to crack the jars. When done, remove jars from the boiling water and fasten covers tightly at once, without having taken covers off. This is important, for no air should enter jars after boiling begins. Invert to cool and test for leakage. Wrap in paper, and store.

Canning Vegetables

Pack vegetables compactly in jars. Add boiling water and salt. Release any air bubbles by slipping a knife or

spatula down between vegetables and jar. Put on rings and cover without fastening them down. Place jars on rack in boiler. Pour warm water in boiler, enough to come about half way up the jars. Put cover on the boiler. Bring water to a boil and boil *gently* as long as required. Remove boiler from the stove, fasten down covers, take jars out and let them cool. If when jars are taken from the boiler there is more than half an inch of space between vegetables and cover, the contents of one jar can be used to fill the rest before the covers are fastened down. Put jars again in boiler and boil 5 minutes more.

Most vegetables are injured in flavor and quality by an excessive use of salt for seasoning in the canning process. A little salt is very palatable, and its use should be encouraged, but it is better to add no salt in canning than to use too much. It can be added to suit the taste when canned goods are served.

The vegetables most commonly used for canning can be divided into four classes:

1. Vegetable greens, such as swiss chards, kale, turnip tops, asparagus, spinach, beet tops, cultivated dandelion, mustard plant.

To Can Vegetable Greens.—Prepare and can as soon as you get them home. Sort and clean. Put in a colander; set colander over boiling water, and steam for 15 or 20 minutes. Remove. Plunge quickly into cold water. Cut in convenient lengths. Pack tight in jars and season to taste. Add hot water to fill crevices and a level teaspoon of salt to each quart jar. Place rubbers and tops in position and partially tighten. Place jars in kettle and boil *gently* for 2 hours. Remove from kettle. Tighten covers. Invert to cool and test for leakage. Wrap in paper to prevent bleaching, and store.

To Can Cabbage, Brussels Sprouts and Cauliflower.

The recipe for canning these vegetables is practically

the same as for the above-named vegetable greens, and the same instructions may be followed.

Experience alone will teach the slight variations necessary in amount of time required for blanching, amount of seasoning necessary for the various vegetable greens, etc.

2. Root and tuber vegetables, such as carrots, parsnips, beets, turnips, etc.

To Can Root and Tuber Vegetables.—Wash thoroughly. Use vegetable brush. Scald in boiling hot water sufficiently to loosen the skin. Plunge quickly in cold water. Scrape or pare to remove skin. Pack whole or cut in sections or cubes. Add boiling hot water and one level teaspoon of salt to each quart jar. Place rubbers and tops in position. Partially seal, but not tight. Place jars in kettle and boil *gently* for 2 hours. Remove from kettle. Tighten covers. Invert to cool and test for leakage. Wrap in paper to prevent bleaching, and store.

3. Special vegetables. Tomatoes and corn.

To Can Tomatoes.—Scald in hot water enough to loosen skins. Plunge quickly in cold water. Remove. Core and skin. Pack whole. Fill jar with whole tomatoes only. Add one level teaspoon of salt to each quart jar. Place rubbers and caps in position. Partially seal, but not tight. Boil *gently* for 22 minutes. Remove jars. Tighten covers. Invert to cool and test for leakage. Wrap jars in paper, and store. An acidity that is disagreeable to the taste is sometimes noted in canned tomatoes. This may be corrected by adding ¼ teaspoonful of baking-soda to a quart of the canned tomatoes when cooking them for table use.

To Can Sweet Corn on the Cob.—Remove husks and silks. Place cobs in boiling water for 5 to 10 minutes. Plunge quickly in cold water. Pack ears, alternating butts and tips, in half-gallon glass jars. Pour over boiling hot water and add 1 level teaspoon of salt to each half-gallon

jar. Place rubbers and tops in position. Seal partially but not tight. Boil *gently* for 3 hours. Remove jars. Tighten covers. Invert to cool and test for leakage. Wrap jars with paper, and store.

NOTE—When sweet corn is taken from jar for table use, remove ears as soon as jar is open. Heat corn, slightly buttered, in steamer. Do not allow ears to stand in water or to be boiled in water the second time.

To Can Sweet Corn Cut from Cob.—Remove husks and silks. Place cobs in boiling hot water for 5 to 15 minutes. Plunge quickly in cold water. Cut the corn from the cob with a thin, sharp-bladed knife. Pack corn in jar. Add one level teaspoon of salt to each quart jar and sufficient hot water to fill. Place rubbers and tops in position; seal partially, but not tight. Boil *gently* for 3 hours; set aside until the next day; then boil for 1 hour more. Remove jars. Tighten covers. Invert to cool and test for leakage. Wrap with paper, and store.

4. *Other vegetables, such as lima beans, stringbeans, peas, etc.*

Recipe for Canning.—Put in boiling hot water for 2 to 5 minutes. Remove and plunge quickly in cold water. Pack in jars until full. Add boiling water to fill crevices. Add one level teaspoon of salt to each quart jar. Place rubbers and tops in position. Partially seal, but not tight. Boil *gently* for 1 hour; set aside until the next day, then boil for 1 hour more. Remove jars. Tighten covers, and invert to cool. Wrap jars in paper, and store.

Drying Fruits and Vegetables

Fruits and vegetables may be dried in the home by simple processes and stored for future use. Especially when canning is not feasible, or cans and jars are too expensive, drying offers a means of saving large quantities of surplus products which go to waste each year in gardens

and fruit plots. Drying also affords a way of conserving portions of food which are too small for canning.

The drying may be done in the sun, over the kitchen stove, or before an electric fan. Manufacturers have placed driers on the market. Homemade driers are satisfactory.

A good homemade drier should have the following features:

(1) It should be light, easy to operate, of simple construction, inexpensive, and, as nearly as possible, noninflammable.

(2) It should permit a free circulation of air, to allow the rapid removal of the air after it has passed over the vegetables and absorbed moisture.

(3) It should provide for protection of the food product against dusts, insects, etc.

(4) It should protect the materials from being moistened by steam, smoke, rain, or dew while drying.

Principles and Methods

Three main ways of drying are applicable in the home manufacture of dried fruits and vegetables, namely, sun drying, drying by artificial heat, and drying by air blast. These, of course, may be combined. In general, most fruits or vegetables, to be dried quickly, must be first shredded or cut into slices, because many are too large to dry quickly or are covered with a skin, the purpose of which is to prevent drying out. When freshly cut fruits or vegetables are to be dried by means of artificial heat, they should be exposed first to gentle heat and later to the higher temperatures. If the air applied at the outset is of too high a temperature, the cut surfaces of the sliced fruits or vegetables become hard, or scorched, covering the juicy interior so that it will not dry out. Generally it is not desirable that the air temperature in drying should go above 140° to 150° F., and it is better to keep it well below this point. Insects

and insect eggs are killed by exposure to heat of this temperature.

It is important to know the degree of heat in the drier, and this can not be determined very accurately except by using a thermometer. Inexpensive oven thermometers can be found on the market, or an ordinary chemical thermometer can be suspended in the drier. If a thermometer is not used, the greatest care should be given to the regulation of the heat. The temperature in the drier rises rather quickly and the product may scorch unless close attention is given. The reason sun drying is popularly believed to give fruits and vegetables a sweeter flavor lies probably in the fact that in the sun they never are scorched, whereas in the oven or over a stove scorching is likely to occur unless careful attention is given them.

Drying of certain products can be completed in some driers within two or three hours. The time required for drying vegetables varies. However, it can be determined easily by a little experience on the part of the person doing the drying. The material should be stirred or turned several times during the drying in order to secure a uniform product.

The ability to judge accurately as to when fruit has reached the proper condition for removal from drier can be gained only by experience. When sufficiently dried it should be so dry that it is impossible to press water out of the freshly cut ends of the pieces, and will not show any of the natural grain of the fruit on being broken, and yet not so dry that it will snap or crackle. It should be leathery and pliable.

When freshly cut fruits or vegetables are spread out they immediately begin to evaporate moisture into the air around them, and if in a closed box will very soon saturate the air with moisture. This will slow down the rate of drying and lead to the formation of molds. If a current of dry air is blown over them continually, the water in

them will evaporate steadily until they are dry and crisp. Certain products, especially raspberries, should not be dried hard, because if too much mositure is removed from them they will not resume their original form when soaked in water. On the other hand, the material must be dried sufficiently or it will not keep, but will mold. Too great stress can not be laid upon this point. This does not mean that the product must be baked or scorched, but simply that it must be dried uniformly through and through.

It will be found advisable also to "condition" practically all dried vegetables and fruits. This is best done in a small way by placing the material in boxes and pouring it from one box into another once a day for three or four days, so as to mix it thoroughly and give to the whole mass an even degree of moisture. If the material is found to be too moist, it should be returned to the drying trays for a short drying.

Preparation for the Drier

In large factories the vegetables are put through special shredders and slicers not adapted for home use, but convenient and inexpensive machines which can be used to great advantage are on the market.

Cleanliness is as necessary in the preparation of vegetables and fruits for drying as in their preparation for canning, perhaps even more so. To secure a fine quality of dried products much depends upon having the vegetables absolutely fresh, young, tender, and perfectly clean. If steel knives are used in paring and cutting, have them clean and bright so as not to discolor the vegetable. The earthy smell and flavor will cling to root crops if they are not washed thoroughly before slicing, and one decayed root may flavor several kettles of soup if the slices from it are scattered through a whole batch of dried material. High-grade dried "root" vegetables can only be made from peeled roots.

Blanching

Blanching of vegetables is considered desirable by some housekeepers, although it is not strictly essential to successful drying. Blanching consists of plunging the vegetable into boiling water for a short time. Use a wire basket or cheese-cloth bag for this. After blanching the required number of minutes, drain well and remove surface moisture from vegetables by placing between two towels or by exposing to the sun and air for a short time.

Apparatus for Drying

The drying of fruits and vegetables in the sun is a simple process if they have been prepared properly. In its simplest form such drying consists in spreading the freshly prepared slices or pieces on sheets of paper, or, if there is danger of the product's sticking, spreading on old pieces of muslin held down with stones. Bright, hot, sunny days are chosen for this work, and a close watch is kept to see that no rain or dew wets the product. If flies and other insects are abundant, a mosquito bar is thrown over the product. Once or twice a day the slices are stirred or turned over with the hand, and the thin ones which dry first are taken out. Sun drying has much to recommend it, since it requires no expenditure of fuel and there is little danger of the product becoming overheated. Dust, however, gathers on the product, and, unless it is protected carefully, flies and especially certain insects which habitually attack dried fruits will lay their eggs upon it. These eggs later will hatch out, and the worms, or larvae, will riddle the dried fruits or vegetables, rendering them unfit for the table.

Fruits and vegetables, when dried in the sun, generally are spread on large trays of uniform size, so constructed that they can be stacked one on top of the other and pro-

tected from rain by means of a cover made of oilcloth, canvas, or roofing paper.

A very cheap tray can be made of strips of lumber three-fourths of an inch thick and 2 inches wide, which form the sides and ends, and lath which is nailed on to form the bottom. Spaces one-eighth inch wide should be left between the laths for ventilation, and the trays can be raised off the ground by placing them on poles or an improvised trestle. As laths are 4 feet long, these lath trays are most economical of material when made 4 feet in length.

Better but more expensive trays can be made by substituting galvanized-wire screen, ⅛ or ¼ inch mesh, for the laths, in which case the most economical size would depend upon the width of the wire screen obtainable.

A cheap and very satisfactory drier for use over the kitchen stove can be made by any handy boy or carpenter from a small amount of small-mesh galvanized-wire netting and a number of laths or strips of wood about ½ inch thick and 2 inches wide. The screen may be tacked directly on the framework to make the drying shelves, or the framework can be made to support separate trays. By using two laths nailed together the framework can be stiffened and larger trays made if desirable. This form or any of the lighter makes of driers can be suspended from the ceiling over the kitchen range or over the oil, gasoline, or gas stove, and it will utilize the hot air which rises during the cooking hour. It can be raised out of the way or swung to one side by a crane made of lath when the stove is required for cooking purposes, and lowered or swung back to utilize the heat which otherwise would be wasted when the top of the stove is not in use.

Still another home drier is the cookstove oven. Bits of food, left overs, especially sweet corn, can be dried on plates in a very slow oven or on the back of the cookstove and saved for winter use. If the oven is very warm the door should be left ajar and the temperature of the oven often

noted. Trays for use in the oven can be made from a convenient sized galvanized wire screen by bending up the edges 1 or 2 inches.

The use of an electric fan in facilitating drying is feasible for those who already own a fan. It has been found that many sliced vegetables and fruits placed in long trays 3 by 1 foot and stacked in two tiers, end to end, before an electric fan, can be dried to the requisite dryness within 24 hours. Some require much less time. For instance, sliced string beans and shredded sweet potatoes will dry before a fan running at a moderate speed within a few hours. In many cities the electric fan will cost not more than one-fourth of a cent an hour to run. The fan should be placed close to the stack of trays, and they should not be filled so full that the air cannot pass freely through them. The fan method has a marked advantage in that the product keeps cool owing to evaporation while it is being dried, thus tending to retain the color and eliminate spoilage.

Precautions against Insects

Two kinds of moths stand out prominently among insects that attack dried fruits and vegetables. They are much more likely to get into the fruit during the process of drying than to find their way through boxes into the products stored inside them. This applies particularly to drying in the sun.

A small moth called the Indian-meal moth is the most destructive insect that attacks dried fruits and vegetables. It is about three-eighths of an inch long and has a cloaked appearance, one-third gray and the rest copper brown. The fig moth is about the same size but dark neutral gray. A minute flattened chocolate-brown beetle usually accompanies these moths and does considerable damage. Warm, dark bins or dried fruit in sacks offer especially favorable places for their development. It is evident that the large

the amount of material in a package, the greater the chance of a few eggs doing a great deal of damage. Small cartons or containers have the advantage of confining the injury from these moths to small quantities of material, for if the containers are closed tightly, they can not easily escape from them and infest other packages, which may not have been infested previously.

In sun drying, if the drying racks are screened early in the evening and at night, the cheesecloth or fly screen battened down, and the dried fruit and vegetables stored in tight paper sacks in a cool place, no danger ordinarily need be feared from these insects. As an additional precaution, the dried product, before being stored, may be heated to 140° F. long enough to allow the heat to penetrate throughout. This will sterilize it if already infested.

In drying by artificial heat, the process itself ordinarily will sterilize the product. But after drying, it should be stored promptly, to prevent infestation.

Packing and Storing

Although not necessary, tin cans or glass jars make food receptacles for storage of dried fruits or vegetables. Pasteboard boxes with tight covers, stout paper bags, and patented paraffin paper cartons also afford ample protection for dried products when protected from insects and rodents. The dried fruit or vegetables must be protected from the outside moisture and will keep best in a cool, dry, well-ventilated place. These conditions however, are difficult to obtain in the more humid regions, and there moisture-tight containers should be used.

If a small amount of dried product is put in each receptacle, just enough for one or two meals, it will not be necessary to open a container, the contents of which can not be consumed in a short time. The use of the small container also makes it more difficult for insects to spoil large quanti-

ties of the dried fruits or vegetables. If a paper bag is used, the upper part should be twisted into a neck, bent over and tied tightly with a string. If a further precaution against spoilage is necessary the bag can be coated with paraffin by painting it with a brush which has been dipped into melted paraffin. Another precaution may be taken by placing the small bags in a tin container with a tightly fitting cover, such as an ordinary lard can or pail. All bags should bear a label indicating what they contain.

If fruits or vegetables are packed in tight containers immediately upon being dried thoroughly, they will remain just as brittle as they were when taken from the dryer. If, however, they are not dried thoroughly, they will "sweat" and soon mold. To prevent this the material should be examined within 24 hours after packing, and if it appears moist it must be dried further.

Cooking Dried Fruits and Vegetables

It must be remembered that the water which has been dried out of the fruits or vegetables must be restored to them before cooking and that this process requires time. In general, the longer it takes to dry the longer should the dried products soak. Because the kind of vegetable (old and tough or young and tender), the size of the pieces (large or small), and the amount of moisture which the dried product contains effect the length of time the vegetable should soak, the housekeeper must use her best judgment in selecting the method of preparation best suited to her own products.

Once soaked, dried vegetables and fruits can be cooked in almost any of the ways in which fresh ones can be cooked.

To Preserve Eggs at Home

As the shells of eggs are porous, air and germs can get into the eggs through the shell and make them unfit to eat. No eggs are perfectly clean when bought; therefore, it is best to wipe them with a clean, damp cloth as soon as you get them home. Clean eggs, kept cool, remain for a week or more practically as good as when laid. As hens lay best in spring and early summer, it is necessary to preserve the eggs that are needed for winter use. Dealers use the cold-storage method, but housewives can preserve eggs at home by using either of the following methods:

1. *Coating With Water Glass.*—Water glass does not cost much. You can buy it at almost any drug or department store.

Directions: Mix water glass with water, using 9 parts of water to 1 part water glass. Put eggs in a stone jar and pour water glass over them, being careful to see that they are well covered. Keep the jar of eggs in a cool place. If you want to boil eggs that have been preserved in water glass it will be necessary to make a tiny pin-hole in the small end of each egg before putting them into the boiling water; otherwise they will explode.

2. *Greasing.*—They can be greased with butter, any butter substitute, lard or in fact any clean fat.

Directions: The grease must be soft enough to be applied with a brush. Be careful to see that the entire egg is greased. Then pack the eggs, small end down, in any wooden box, putting a strip of cardboard between each egg so that the eggs do not touch each other. Keep the box of eggs in a cool place.

3. *Packing in Sawdust.*

Directions: Pack eggs in sawdust, small end down. Be sure that each egg is entirely covered with the sawdust. You can use any wooden box to pack them in. Keep the box of eggs in a cool place.

The Fireless Cooker

A fireless cooker is a box so made and lined that when food is heated over a fire for a short time and then placed in the box, the heat will be retained in the box and the food will continue to cook without the use of any additional fire or heat.

The fireless cooker is particularly good for cooking the less tender cuts of meat or meat that requires long cooking. It can also be used for cooking soup, pot roast, beef stew, Irish stew, lamb stew, corned beef and cabbage, boiled ham, baked beans, chicken fricassee, vegetables such as turnips, parsnips, carrots and beets, dried vegetables such as peas, beans and lentils, dried fruits such as peaches, apples, apricots and prunes, cereals, and puddings.

Most people do not cook cereals long enough. By using a fireless cooker you can prepare your cereal at night, cook it on the stove for about fifteen minutes, put it in the fireless cooker, and when you get up in the morning you will find it all cooked and ready to be eaten. In this way you save both time and fuel.

Lots of women who have to be away from their homes all day prepare the family dinner in the morning, put it in the fireless cooker and find it cooked and ready to be eaten on return at night. This is a great help to the woman who has to work hard all day and who is too tired to prepare and cook a dinner when she gets home at night.

There are various makes of fireless cookers that can be bought in stores where household furnishings are sold. They range in price from $5 to $22, according to the size and make of the cooker.

It is not necessary, however, for you to buy a fireless cooker. You can easily make one at home. You will find it will save not only your time but many dollars on your coal and gas bills.

Directions for Single Cooker

Materials Needed

Galvanized iron can, No. 3, with cover, about	$0.78
Sawdust, about	0.10
Two yards denim, about	0.45
Covered agate pail (to be used as cooking-pail), about.	0.20
Total	$1.53

(It is not absolutely necessary to use denim. You can use an old tablecloth, muslin, canton flannel or any old woolen material you happen to have on hand).

Method.—Place loose sawdust in the bottom of the can to a depth of about 3 inches. Fold the two yards of denim or other material lengthwise and make a long bag. This bag, when empty, should be about two inches deeper than the cooking-pail. Fill the bag with sawdust; lay the bag flat on the table and spread the sawdust evenly. When filled with sawdust the bag should be a little deeper than the cooking-pail. Then roll the bag around the cooking-pail so that a smooth, firm nest is formed when the bag is placed upright in the can on top of the sawdust. From the remaining denim or other material make a round flat bag (material will have to be pieced for this.) Fill the bag with sawdust and use it on top of the cooking-pail. The bags must be made and fitted into the can in such a way that there will be no open space whatever between the sides of the cooking-pail and the can, or between the top of the cooking-pail and the cover of the can, through which heat can escape.

Directions for Double Cooker

Materials Needed.—Three wooden boxes (one long box and two square boxes; the long box must be large enough to hold the other two and still leave at least two inches of space between all the boxes). Your grocer will

doubtless be glad to let you have the boxes without charge or at a very small cost.

Sheet asbestos, 5¼ yards, one yard wide, at about 20c. per yard	$1.05
Two covered agate pails (to be used as cooking-pails), about	0.40
Denim, 1 yard, about	0.22
Total	$1.67

(Any old muslin, canton flannel or wool goods that you happen to have on hand may be used in place of denim.)

Method.—First of all line the bottoms and sides of all three boxes with the sheet asbestos. Then in the bottom of the long box lay newspapers flat to a depth of about one-half an inch. Then put two inches of sawdust on top of this layer of newspapers. Then place the two square boxes inside the long one, leaving at least two inches of space between the two square boxes. Fill all the spaces between all the boxes with sawdust. Then tack a strip of denim or other material from the edges of the square boxes to the outside edge of the long box; also across the space between the two square boxes, so that the strip of denim will cover all the spaces that are filled with sawdust.

The outside box must have a wooden lid. Line the lid with the sheet asbestos to within a half inch of the edge of the lid. Then put a layer of sawdust one inch deep on top of the asbestos. Then tack a piece of denim or other material over the sawdust, still leaving the edge free and clear so that the cover will fit down tightly. Or the lid may be lined with asbestos and a pillow made of denim or other material and filled with sawdust that will fit tightly down into the top of the box.

General Directions for Cooking

All food must first be cooked on the stove in the cooking-pail for the length of time given. Then the cooking pail

with the food in it, must be taken directly from the stove and put into the cooker without delay. This is absolutely necessary in order to retain in the pail and in the food the heat that is needed to continue the cooking.

Soups should be cooked on the stove in the cooking-pail for about thirty minutes, then put in the fireless cooker and left for about 12 hours. Reheat before serving.

(If the soup were cooked on a coal or gas stove until done you would have to use your fire 3 or 4 hours. By using the fireless cooker you save from 2½ to 3½ hours of coal or gas.)

Pot Roast.—Get a 3-pound piece of beef cut from the neck, shoulder or cross cut. Wipe it off with a damp cloth, season it, dredge it with flour, and then brown well on all sides in a hot greased frying-pan. Then put the meat in the cooking-pail, with an inverted saucer or something else under it to keep it from sticking. Add boiling water about two-thirds of the way up the roast. Cover tightly and let simmer on the stove for 20 minutes. Then add ½ cup each of diced carrots, turnips, potatoes and onions and 1 teaspoon of salt. Let it come to a boil and then place in fireless cooker and let it stay in for 7 or 8 hours. Then remove meat to a hot platter, put the vegetables around the meat, and make a gravy of 1 tablespoon of butter or drippings, 1 tablespoon of flour and 1 cup of the liquid strained from the roast. Season the gravy and serve with meat and vegetables.

(It would take about 3 hours to cook this on your stove. By using the fireless cooker you save about 2½ hours of coal or gas).

Beef Stew.—(For making stews use ends of ribs, neck, knuckle or hind shin.) Cut beef into small pieces; add one onion cut in small pieces. Put this in cooking-pail with an inverted saucer or something else under it to keep it from sticking. Add enough cold water to cover meat. Bring to simmering point. Let it simmer 20 minutes. Then add halved or quartered potatoes, a few pieces of carrot and

turnip, salt and pepper to taste. Let it come to a boil and then place the pail in the fireless cooker and leave for 7 or 8 hours. Before potatoes are added to the stew boil them for five minutes on the stove.

(It would take about 3 hours to cook this on your stove. By using the fireless cooker you save 2½ hours of coal or gas.)

Mutton or Irish Stew.—Follow directions given for beef stew, leaving it in fireless cooker for 5 or 6 hours.

Lamb Stew.—1½ lbs. breast of lamb, 1 pint boiling water, 4 medium-sized potatoes quartered and parboiled, 1 sliced onion, 2 tablespoons rice, 1 cup strained tomatoes, salt and pepper.

Brown the onions in a little fat in the cooking-pail; then add the meat cut roughly into cube-shaped pieces; sprinkle with salt and pepper. Cover with boiling water. Let it simmer on the stove for 20 minutes. Then add potatoes, rice and tomatoes. Let it come to a boil and then place in fireless cooker for 4 or 5 hours. (By using the fireless cooker you save 1½ hours of coal or gas.)

Corned Beef and Cabbage.—Prepare in your usual way and cook the corned beef on the stove in the cooking-pail for about 30 minutes. Then put the corned beef in fireless cooker and leave for about 6 hours. Then add the cabbage and leave in fireless cooker for 2 hours more.

(If cooked entirely on your stove corned beef would take about 3 hours. By using the fireless cooker you save 2½ hours of coal or gas.)

Boiled Ham.—Cook on the stove in the cooking-pail for about 30 minutes. Then put in the fireless cooker and leave for 8 or 10 hours, or overnight.

(By using the fireless cooker you save at least 3 hours of coal or gas.)

Baked Beans.—1 quart of white beans, 1 teaspoon of baking soda, ¼ pound salt pork, 2 tablespoons of molasses, 1 teaspoon of mustard.

Wash beans and then soak them in cold water for one hour. Then pour off the water and put beans into cooking-pail. Cover with cold water, add the soda and cook gently on the stove until beans are slightly softened. Pour off water; mix molasses and mustard with a pint of water and pour this over the beans, adding more water if the beans are not covered. Place the pork upon the beans, bring to boiling, and cover the pail. Then put in fireless cooker and leave for ten or twelve hours.

(Baked beans would require 6 to 8 hours if baked in a gas or coal oven. By using the fireless cooker the coal or gas is only used for 30 minutes, making a wonderful saving.)

Chicken Fricassee.—Cut up chicken and roll each piece in flour; brown pieces in fat; as each piece is browned, pack in cooking-pail. Make some gravy in pan in which browning is done. Pour gravy into the cooking-pail and add enough water to cover chicken. Season to taste with salt and pepper. Boil 20 minutes on stove; then put in cooker for overnight. Reheat it when you want to use it.

(By using the fireless cooker you save about 2 hours of coal and gas.)

Turnips, Parsnips, Carrots and Beets.—Prepare in your usual way and boil on the stove in the cooking-pail for not more than five minutes. Then put in the fireless cooker. Leave turnips, parsnips and carrots in fireless cooker for 1½ to 2 hours; beets 5 or 6 hours.

(By using the fireless cooker you save a great deal of coal or gas.)

Dried Peas, Beans and Lentils.—Prepare in your usual way and cook on the stove in the cooking-pail for ten minutes. Then put in the fireless cooker and leave for 8 to 10 hours.

(By using the fireless cooker you save at least 3 hours of coal or gas.)

Dried Peaches, Apples, Apricots and Prunes.—These require long slow cooking and little sugar. Dried prunes do

not require any sugar at all, as the long slow cooking develops the natural sweetness in the fruit.

Wash all dried fruit carefully. Put in cooking-pail and cover with cold water, using one pint of fruit to 1½ pints of of water. Bring to the simmering point on the stove and simmer for about 15 minutes. Then place in fireless cooker and leave for 6 or 8 hours or overnight.

(You save at least 3 hours of coal or gas by using the fireless cooker for these.)

Cereals.—Put in cooking-pail and cook on the stove for about 15 minutes and then put in the fireless cooker and leave for 12 to 15 hours or overnight. Cereals require long slow cooking, and by using a fireless cooker you save a great many hours of coal or gas.

Creamy Rice Pudding.—1 cup rice, 1 pint milk, 4 tablespoons sugar, ⅛ teaspoon salt, some nutmeg or cinnamon.

Boil rice for about five minutes. Add milk without pouring off the water; then add sugar and salt. Pour into a buttered pail, cover tightly, and place in cooking-pail half full of boiling water. Boil over fire for five minutes. Then put in fireless cooker and leave for about 6 to 8 hours. When finished grate nutmeg over the top or sprinkle with cinnamon, or a stick of cinnamon may be boiled with the rice.

(You save more than 1½ hours of coal or gas by using the fireless cooker.)

(It is well to place an inverted saucer in the bottom of the pail of hot water so that the pudding will not get too hot while cooking on the stove.)

Steamed Custard.—1 quart milk, 4 eggs, ½ teaspoon salt, ½ cup sugar, nutmeg.

Scald the milk in a double boiler; beat the eggs slightly and add the sugar and salt; then gradually add the scalded milk. Pour into buttered pail, cover tightly, and place in cooking-pail half full of boiling water. Boil over fire for 5

minutes; then place in fireless cooker for 1¼ hours to 2 hours. When finished grate a little nutmeg over the top of the pudding.

(It is well to place an inverted saucer in the bottom of the pail of hot water so that custard will not get too hot while cooking on the stove.)

Apples in Syrup.—Pare and core sour apples and then cut in half. Make a syrup of 1 cup sugar and 1 cup water. Cook over fire in cooking-pail until clear. Add apples and boil five minutes. Then put in fireless cooker for 4 or 5 hours.

Chapter *TEN*

The Little Children's Table —School Lunches

SIMPLE, clean, wholesome food of the right kinds fed to children in proper quantities and combinations will go farther than almost any other single factor in assuring them normal health and sturdy development.

A little child who is carefully fed in accordance with his bodily needs (as these are now understood) receives every day at least one food from each of the following groups:

1. Milk and dishes made chiefly of milk (most important of the group as regards children's diet); meat, fish, poultry, eggs, and meat substitutes.
2. Bread and other cereal foods.
3. Butter and other wholesome fats.
4. Vegetables and fruits.
5. Simple sweets.

As to the amounts that should be served, a good rule is to provide three or four glasses (1½ pints to 1 quart) of milk a day; an egg or its equivalent in moderately fat meat, fish, poultry, or meat substitute; fruit and vegetables each once a day; 1 to 2 ounces of butter or other wholesome fat; and

NOTE.—"Food for Young Children" (1917), and "School Lunches" (1916), both by Caroline L. Hunt and published by the United States Department of Agriculture, have been freely quoted in the preparation of this chapter.

all the bread or other cereal food the child will eat. One or two ounces of sugar, candy, or other sweet (including the sugar used in cooking) may also be allowed, if this does not prevent eating the other foods mentioned.

The following bills of fare are simple, easy to prepare, sufficiently varied, and, if well prepared, should taste good. They are so planned that milk and another food from group 1 and a food from each of the other groups will be served at least once a day.

Suggested Bills of Fare

Breakfast

Orange (juice only for the youngest children).
Farina with milk
Bread and butter

Stewed prunes (pulp and juice only for the youngest children)
Corn-meal mush and milk
Toast and butter

Apple sauce
Oatmeal with milk
Toast and butter

Grape fruit (juice only for the youngest children)
Milk toast with grated yolk of hard-boiled egg

Baked pears (pulp and juice only for the children)
Milk toast
Cocoa

Apple (scraped for very little children)
Toast
Hot milk

In each case enough milk should be given to make up the required daily amount, which is about a quart.

Dinner

Meat soup
Egg on toast
String beans
Rice pudding

Creamed potatoes
Green peas
Stewed plums with thin cereal-milk pudding.

Roast beef	Baked halibut
Baked potatoes	Boiled potatoes
Asparagus	Stewed celery
Bread and jelly	Boiled rice with honey or sirup
Lamb stew with carrots and potato	Broiled meat cakes
Twice-baked bread	Grits
Tapioca custard	Creamed carrots
	Bread, butter, and sugar sandwiches.

In each case enough milk should be given to make up the required daily amount, which is about a quart.

Supper

Baked potatoes, served with cream and salt, or with milk gravy	Graham crackers and milk
Cookies	Baked custard
Bread and milk	Milk toast
Apple sauce	Stewed peaches
Sponge cake	Cup cake
Potato-milk soup	Celery-milk soup
Twice-baked bread	Toast
Marmalade sandwiches	Floating island

In each case enough milk should be given to make up the required daily amount, which is about a quart.

Though all the foods mentioned in the bills of fare may be included under five heads, the diet need not be monotonous, for many foods come under each class.

A Mother's Catechism

At the close of the day the mother might ask herself questions like the following to make sure that she has

taken into account the things to which her attention has been directed:

Did the child take about a quart of milk in one form or another?

Have I taken pains to see that the milk that comes to my house has been handled in a clean way?

If I was obliged to serve skim milk for the sake of cleanliness or economy, did I supply a little extra fat in some other way?

Were the fats that I gave the child of the wholesome kind found in milk, cream, butter, and salad oils, or of the unwholesome kind found in doughnuts and other fried foods?

Did I make good use of all skim milk by using it in the preparation of cereal mushes, puddings, or otherwise?

Were all cereal foods thoroughly cooked?

Was the bread soggy? If so, was it because the loaves were too large, or because they were not cooked long enough?

Did I take pains to get a variety of foods from the cereal group by serving a cereal mush once during the day?

Did I keep in mind that while cereals are good foods in themselves, they do not take the place of meat, milk, eggs, fruit, and vegetables?

Did I keep in mind that children who do not have plenty of fruit and vegetables need whole-wheat bread and whole grains served in other ways?

Did each child have an egg or an equivalent amount of meat, fish, or poultry?

Did any child have more than this of flesh foods or eggs? If so, might the money not have been better spent for fruits or vegetables?

If I was unable to get milk, meat, fish, poultry, or eggs, did I serve dried beans, or other legumes thoroughly cooked and carefully seasoned?

Were vegetables and fruits both on the child's bill of

fare once during the day? If not, was it because we have not taken pains to raise them in our home garden?

Did either the fruit or the vegetable disagree with the child? If so, ought I to have cooked it more thoroughly, chopped it more finely, or have removed the skins or seeds?

Was the child given sweets between meals, or anything that tempted him to eat when he was not hungry?

Was he allowed to eat sweets when he should have been drinking milk or eating cereals, meat, eggs, fruit, or vegetables?

Were the sweets given to the child simple, i. e., unmixed with much fat or with hard substances difficult to chew, and not highly flavored?

Was the child made to eat slowly and chew his food properly?

School Lunches

The basket lunch is harder to plan and also to prepare than the lunch at home. To begin with, there are many foods which can not be included in it, either because they are not good cold or because they can not be conveniently packed or easily carried. This leaves fewer foods to choose from, and so extra care is necessary to prevent sameness. Extra care is needed, too, in the preparation of foods that must be packed in small compass and kept for several hours before being eaten and that must very often be carried over dusty roads.

On the other hand, the number of foods that can be easily carried has been enlarged of late by the possibility of using paraffin paper and parchment paper, in which moist foods can be wrapped so as to prevent them from sticking to other foods. Paper cups, jelly glasses, and so on, are also a help, for in them sliced raw fruits, stewed fruits, custards, cottage cheese, and other half-solid foods can be carried.

The quality of the bread used in the basket lunch is

especially important because it is commonly served in the form of sandwiches and is, therefore, to be considered not only as a food in itself but also as a means of keeping other much-needed foods in good and appetizing condition, or of serving them in attractive ways.

Variety in breads, too, is more important at this than at other meals because of the danger of monotony. Wheat bread, whole-wheat bread, corn, rye, or oatmeal breads; nut, raisin, and date breads; beaten biscuit, rolls, crisp baking powder biscuit, or soda biscuit, and toast, zwieback, and crackers may be used in turn to give variety. Rolls hollowed out can be made to hold a large amount of sandwich filling, which is an advantage at times.

Bills of Fare for the Basket Lunch

1. Sandwiches with sliced tender meat for filling; baked apple, cookies or a few lumps of sugar.

2. Slices of meat loaf or bean loaf; bread and butter sandwiches; stewed fruit; small frosted cake.

3. Crisp rolls, hollowed out and filled with chopped meat or fish, moistened and seasoned, or mixed with salad dressing orange, apple, a mixture of sliced fruits, or berries; cake.

4. Lettuce or celery sandwiches; cup custard; jelly sandwiches.

5. Cottage cheese, and chopped green-pepper sandwiches or a pot of cream cheese with bread-and-butter sandwiches: peanut sandwiches; fruit; cake.

6. Hard-boiled eggs; crisp baking-powder biscuits; celery or radishes; brown-sugar or maple-sugar sandwiches.

7. Bottle of milk; thin corn bread and butter; dates; apple.

8. Raisin or nut bread with butter; cheese; orange; maple sugar.

9. Baked bean and lettuce sandwiches; apple sauce; sweet chocolate.

Chapter *ELEVEN*

Household Accounts — The Budget — Marketing

WHEN the members of a family have made a plan of yearly expenditure, they must have some way of testing at short intervals whether they are keeping to it or not, and some record by which at the end of the year they can tell whether their plan is a good one.

A favourite excuse for not keeping accounts is this: I have just so much, and I can't spend what I haven't, so what's the use? This ignores two things. The first is, that spending a little more than one's income, and thus gradually running up a debt, is an extremely easy thing to do. The second is, that people who do not plan their expenditures, deprive themselves of the chance to choose what their expenditures shall be made for. If you plan to have strawberries and cream on the first Monday in February, and bread and tea on the next Saturday, and you like that, then there is nothing more to say—except to hope for improvement in the next generation. If, however, in the exuberance of appetite or hospitality you have strawberries and cream on the first Monday in February, and are awfully

surprised to find you can only afford bread and tea on Saturday—then you need to realize that you have deprived yourself of the freedom of choice, whether right or wrong, and that you had better keep a few accounts.

There are two sides in accounts, which are usually represented by opposite pages in a book. The right-hand page is the *Credit* side; the left hand page is the *Debit* side. On the right hand, or Credit, page are written the sums of money we have or acquire. On the left-hand, or Debit, page are written the sums of money we have paid out.

At the end of a day, or a week, or a month, as seems best, the account is balanced. This word balanced is a metaphor. By its means the credit and the debit pages are changed into the pans of a pair of scales, and the account is balanced when they hang even. That is, when the items on the debit page add up to the same amount that the items on the credit page add up to, the account balances. But suppose the pages do not add up to the same amount—they rarely do and they rarely should—what then? Then the metaphor of the balance suggests what to do. If one scale-pan is lighter than the other, put a weight into it. If the debit side is lighter, that is, if it is less than the credit side, add on the amount which will make it even with the credit side, and write beside that amount, "Balance." In that case, there is a little money yet unspent and when the next two pages of the accounts are begun this money yet unspent is put down at the head of the credit page like this:

Balance on hand..... $2.39

If, on the contrary, the credit side is less than the debit side, add the balance there.

Personal Expense Account

Two pages of an account such as a girl might keep of her personal expenses, when balanced at the end of a week look like this:—

1909		*Cash*	*Dr.*		1909		*Cash*	*Cr.*	
July	1	Veil		50	July	1	Bal. on hand		25
"	"	Soda		20	"	"	Allowance	10	00
"	3	Gloves	2	00	"	3	Birthday	5	00
"	4	Church		25					
"	5	Carfare		10					
"	"	Shampoo		75					
"	6	Postage		20					
"	"	Carfare		10					
"	7	Balance	11	15					
			15	25				15	25

Household Accounts

One would think that simple household accounts might be kept like this personal cash-account. They could, except that it is desirable, almost necessary, that household accounts should be divided into departments. The departments will be those which have been decided upon in the plan of expenditure, such as food, clothes, fuel, savings, etc. There are several ways in which accounts can be kept in departments.

One method is, to begin in different parts of an account-book, accounts for each department like the simple cash-account above. It is convenient to have an indexed book, or else to paste slips on the pages where each account begins, which will stick out beyond the leaves and indicate by a word or an initial what department will be found there. The book should be one made for accounts, for then it will be ruled correctly. In each place where a department

begins, write the name of the department at the head of opposite pages. On the credit page put down the amount allotted to this department for a week or month. This amount is copied from the plan of expenditure, which should be written down in the beginning or end of the book. On the debit page write the names of the items for which the money is spent and the dates. It is safer to balance house-accounts once a week. This prevents the use of more than the week's allowance, or if it has been necessary to use more, this serves as a warning to spend less than the allowance the next week. Below is a brief, two-weeks' account for the Clothes Department.

1909	*Clothes*	*Dr.*		1909	*Clothes*	*Cr.*	
May 1	Hat	8	00	May 1	Month's allowance	25	00
" 3	Buttons		20				
" 5	Shoes	5	00				
" 7	Balance	11	80				
		25	00			25	00
May 8	Thread		30	May 8	Bal. on hand	11	80
" 12	Silk	2	00				
" "	Socks	3	00				
" 14	Balance	6	50				
		11	80			11	80

If it should happen that one department has to help another department, put the amount down on the credit page as: From X—Department—$10.00.

A general account can be kept to supplement the detailed accounts. It will be well to have a small account book especially for this purpose. Two of its pages will look like the example on the next page. The items on the debit page are gathered from detailed accounts such as have been described. Completed for a month, it should be balanced as any account is balanced.

1909	General Acc.	Dr.		1909	General Acc.	Cr.	
Jan. 1	Savings for Jan..	5	00	Jan. 1	Salary.....	125	00
" 3	Rent " " ..	35	00	" 15	Interest on.....		
" 31	Clothes " " ..	20	00		investment	15	00
" "	Food " " ..	38	00				
" "	Fuel " " ..	8	00	" 25	Extra work.....	10	00

Checkbook Accounting

Many people keep no accounts except in their checkbooks. That is, they write down carefully therein the date and source of every check deposited; and on the stub of each check drawn they write the purpose for which the money is to be used. This method is much better than no account keeping, but it is hardly detailed enough for a house account in which there are many items too small to be paid by check. After every three or four checks there is apt to be one marked "Incidentals," or "General Expenses." Into these indefinite checks often go the trip the family meant to take, the table linen they meant to buy, the savings they meant to put away, and at the end of a year it is impossible to say what they had instead.

*The Wartime Budget

In those dim years before August, 1914, Mr. Earl G. Manning of Boston, prepared a budget made up of actual figures furnished by thousands of thrifty Americans. It is given here in Table I. This table has formed the basis of much budget making, but, like so many other calculations of ante-bellum days, it is now antiquated. To follow it *in toto* would be to encourage financial suicide. A new budget must be drawn. Where the family receiving

*Adapted from part of an article by Stuart Chase, published in *The Independent* in the summer of 1917.

TABLE I.

Yearly Home Budgets of Families Averaging Two Adults and Two Children

Prepared by Earl G. Manning

Income of	$1,000	%	$2,000	%	$3,000	%	$4,000	%	$5,000	%
Food	$300	30	$450	22	$550	18	$675	17	$725	14
Shelter	200	20	400	20	500	17	600	15	700	14
Clothing	100	10	250	12	325	11	500	12	650	13
Operating	150	15	350	18	550	18	625	16	750	15
Advancement	100	10	250	13	450	15	600	15	775	16
Total	$850	85	$1,700	85	$2,375	79	$3,000	75	$3,600	72
Income	1,000	100	2,000	100	3,000	100	4,000	100	5,000	100
Savings and Insurance	$150	15	$300	15	$625	21	$1,000	25	$1,400	28

an income of $1000 spent 30 per cent of it for food, it must now spend 45 per cent; where the $5000 family spent 14 per cent for food, it must now spend 22 per cent. And note how the war burden bears proportionately harder on the poor than on the well-to-do. The greater the share of the

TABLE II.

Yearly Home Budgets for Wartime of Families Averaging Two Adults and Two Children

Income of	$1,000	%	$2,000	%	$3,000	%	$4,000	%	$5,000	%
Food	$450	45	$675	34	$825	27	$1,015	25	$1,000	22
Shelter	220	22	440	22	550	19	660	17	770	15
Clothing	140	14	350	17	490	16	750	19	975	20
Operating	180	18	420	21	720	24	830	21	1,225	24
Advancement	50	5	115	6	300	10	500	12	700	14
Total	$1,040	104	$2,000	100	$2,885	96	$3,755	94	$4,760	95
Income	1,000	100	2,000	100	3,000	100	4,000	100	5,000	100
Surplus	.....		.....		$115	4	$245	6	$240	5
Deficit	$40	4								

family income spent on bare necessities, the more grievous the burden of war. For the poor, luxuries and advancement† must be almost forced out of existence. For the well-to-do, these expenditures must be drastically curtailed. Taking into consideration the new factors of High Cost Living and War Taxation, we have ventured to prepare a revised war budget. (Table II, page 263.)

The $1000 family with only a 5 per cent outlay for "advancement" is going to over-spend its income. The $2000 family should break about even. Above $3000 a small surplus should accrue, but here enters boldly a new factor which has long hovered in the background; namely, philanthropies. Red Cross, special relief units, children's aid, support of war widows and orphans, etc., will all call for, nay insist upon, volunteer financial support. The "advancement" account of the $3,000-and-over family will have to bear the brunt of these appeals. For this reason we have allowed almost as much for "advancement", in the $4000 and $5000 classes, as did the old Manning budget.

What Are We To Do?

It is plain that the household budget has some trying years ahead of it. The burden of war taxation will continue for an indefinite period; and even if we succeed in stamping out food speculatiion, and in conserving the food-supply on an efficient basis, it is doubtful if we can do more than hold prices at their 1917 level. The budget is up against it any way. Each family will have to work out its own problem, but at least we can strive to eliminate waste; we can cut down on luxuries; we can grow more food.

†"Advancement" covers expenditures for cultural, philanthropic, religious and kindred purposes.

*Hints on Marketing

First, go to the store yourself; second, select for yourself the article you desire to purchase; third, inquire its price.

If quality and price please you, be sure that you get in weight or measure the amount you buy. *Watch the scale. Watch the measure.*

If the meat you purchase is weighed in a piece of paper or anything else, be sure you are not charged for the weight of the paper.

You are entitled to all the bone and the trimmings of the piece of meat that you buy. You should take home and make use of such bone and trimmings. The fat can be rendered and used for cooking purposes; the bone and trimmings used for soup or stew. When the trimmings are not taken home the butcher throws them into a box under the counter and sells them to someone else. *They belong to you and you should have them.*

In buying meat, don't go in and ask for 25c. worth of meat and leave the butcher to decide how much meat you should have for a quarter. Select your piece of meat, ask the price per pound; say how many pounds you want; have it weighed; see that you get your weight and that the butcher's calculation as to how much meat you have, at a certain price per pound, is correct. *Many a penny is lost to the customer by neglecting the above simple precautions.* In marketing, the pennies count up very fast.

Don't allow your dealer to weigh in the wooden butter dish in weighing your butter unless he deducts the weight.

Don't buy in small quantities if you can possibly avoid it. Make every effort to get together two or three dollars. This will enable you to buy for cash; buy in larger quantities; buy where you can do the best. In this way you can save two or three dollars in a very short time.

*Adapted from "Hints to Housewives," 1917.

Under the laws you have definite rights in the matter of getting full measure and full weight for everything you buy. Cheapness does not always mean quality or full weight. Be sure you get quality and quantity.

Buy in Bulk

Wherever possible buy in bulk and not in package. *Have you ever stopped to figure out how much more you would get for your money if you bought certain articles of food by the pound instead of by the package?*

Food that is wrapped and sold in attractive-looking packages must of necessity cost more than the same food sold in bulk, which means sold by the pound. In the first place, the box or jar containing the food costs money. The wax paper used costs money. The wrapper costs money. The printing on the wrapper costs money. And it also costs money to fill the packages and seal them. It follows therefore, that you cannot possibly get as much food for your money when so large a part of your money has to pay for the box, wrapper, printing, etc.

There are several reasons why so many foods are put up in packages. *First*, the package looks pretty, appeals to the eye, and makes the food seem more appetizing; *second*, most of the packages are air-tight and dustproof, and for sanitary reasons a great many people prefer food that is done up in packages.

As a matter of fact, it is possible for your grocer to keep on hand, in bulk, exactly the same foods as the packages contain, and it is also possible for him to keep them in bulk in a perfectly sanitary manner, so that dust and dirt cannot reach them.

Steam-Cooked Cereals.—Steam-cooked cereals are not economical. Many cereal preparations, including most of those sold in packages, have been partially steam-cooked at the factory. This shortens the time required to prepare

them for the table, but, on the other hand, it injures their flavor and adds to them a large quantity of water, for the weight of which the purchaser pays. One cup of raw oatmeal will absorb four cups of water. One cup of steam-cooked oatmeal will absorb only two cups of water. *Therefore, one cup of raw oatmeal, when cooked, will make twice as much as one cup of steam-cooked oatmeal, when cooked.*

An argument in favor of steam-cooked cereals is that they save time and fuel, but the raw cereals not only are more economical but far more nourishing, and you can shorten the time of cooking by soaking them overnight. All cereals require long, slow cooking. You can save both time and fuel, therefore, by using a fireless cooker for cereals. Cook the cereal on the stove for about 15 minutes; then put in fireless cooker and leave overnight. You will find it all cooked and ready to be eaten when you get up in the morning. For information as to how to make a fireless cooker at home and what can best be cooked in it, see Chapter IX in this book.

If you will buy your *Tapioca, Tea, Soda Crackers, Graham Crackers, Ginger Snaps, Macaroni* and *Starch* in bulk instead of in package, you will get a great deal more for the money you spend. You will find it cheaper to buy your *Vinegar* loose rather than by the bottle. You will get a great deal more *Bacon* for less money if you will buy it in bulk instead of by the jar. You can get twice as much Shredded Codfish for the same money if you buy it loose rather than by the package.

Peaches and Apricots.—A can of peaches or apricots contains very little fruit. A pound of evaporated peaches or apricots costs less than a can and contains at least three times as much fruit. If properly cooked, evaporated peaches and apricots are just as good as, if not better than, the canned fruit and, in addition, you get a great deal more for your money.

Peas and Lima Beans.—By buying dried peas and lima

beans instead of canned ones you can get twice the amount for one-half the money. Dried peas and lima beans can be used in place of canned peas or beans for creamed soups and purees, and one cup of dried peas or beans will go as far as two cups of canned peas or beans.

Beans.—Canned baked beans are expensive. Even counting in the cost of fuel you can bake the same amount of beans for one-half the money.

Tomatoes.—Instead of using whole canned tomatoes for soups, sauces, etc., buy canned tomato pulp, which costs one-half the price.

Why buy things in packages when you can get almost twice as much of the same article for the same amount of money if you buy it in bulk Sit down and make a list of the various foods that you have been in the habit of buying in packages. Think of the money you might have saved had you bought them in bulk. Make up your mind to buy them in bulk in the future, if it is possible for you to get them. It will pay you to break yourself of the package habit. *There are many foods sold now in packages only that your grocer will be glad to carry in bulk as soon as he knows that you and his other customers want them.*

The manufacturer, the wholesale dealer and the retail dealer keep on the watch all the time to find out what the public wants. Of late years the public has seemed to want food in attractive packages at a high cost. *As soon as people learn that by demanding it they can get exactly the same food in bulk, kept in a perfectly sanitary manner, for about one-half to two-thirds the cost of package food, the manufacturer, the wholesaler and the retailer will meet the demand.*

*Parcel Post Marketing

A thorough study of the possibilities of parcel post marketing is being conducted by the United States Depart-

* Largely quoted from "Farmers' Bulletin 703."

ment of Agriculture. The results of this study are being published in a series of bulletins. (*See Farmer's Bulletins 594 and 703.*)

There is no reason why farmers cannot make extensive use of the parcel post system of marketing. One of the chief factors in preventing this has been the price asked by some farmers for produce. To illustrate: One farmer's wife was receiving 20 cents a pound for butter in her local market, a country store. When asked if she would be willing to ship it to a city by parcel post, and at what price, she replied that she would do so at 50 cents a pound. Would-be purchasers frequently have been known to offer producers a lower price than they can obtain in their local markets. It is needless to say that such imperfect and erroneous ideas as to proper and equitable prices altogether defeat the possibility of marketing produce by parcel post. Business in marketing by parcel post can be secured and held only by shipping produce of high quality and by charging reasonable prices.

The larger the quantity, within the postal limits, that is shipped at any one time the more economical is the factor of postage and therefore the more attractive from the viewpoint of cost both to the producer and to the consumer. This applies both to shipments and the return of empty containers. It would not be economical to secure half a dozen different kinds of vegetables from as many different producers, but if a supply of half a dozen kinds of vegetables, or vegetables and fruits, could be obtained in one parcel from one producer it would be both advantageous and attractive.

Mutual confidence and helpfulness are needed in order to succeed; cooperation is needed. Consumers are interested in buying by parcel post only when they can secure more satisfactory produce, some advantage in price, or both. The producer will not be interested in marketing by parcel post unless it means some additional net return to him. A high quality of produce, well prepared, carefully and

attractively packed, and forwarded so as to reach its destination at the time desired will go a long way toward the establishment and continuance of business. Ordinary or inferior produce will not only lose a customer but hinder the gaining of others. The producer must aim to give satisfaction by supplying his customers, as nearly as possible, with produce which meets their individual desires. The consumer must also aim to give satisfaction by properly caring for and returning containers, making prompt remittances as agreed upon, and by doing his part in all phases of the transaction. In other words, a square deal is needed.

Chapter *TWELVE*

Plumbing and Sanitation

IF the walls of a house are its bones, then plumbing must stand for veins and arteries. Hence, whether buying, building, or renting, it behoves every home-maker to look well to the ways of it, and, further, to know enough to make such looking effective. While the technics of plumbing constitute a science not easily mastered, certain concrete details are within the simplest comprehension, and it is these concrete details with which home-makers have the nearest concern.

In building, whatever else is skimped or bargained over, let the plumbing estimate be generous. As far as possible have the work done by men who take pride in efficiency. It may seem sarcasm to refer to a plumbing conscience, yet it certainly exists. There are plumbers and plumbers; some as scampish as they are autocratic, but very many more with the full complement of artisan pride in doing not merely fair work, but the best work possible. Such work seems dear, yet in the end is really cheap. Witness this case in point. A home-maker who had bought a house had it newly plumbed throughout before moving in. Two plumbers bid for the work, one fifty dollars less than the other. Of course the cheaper man got the job; he also got through with it very quickly. Upon the face of it he did good work. The basins, fittings, and so on, were trig and true. No water dripped

from any faucet, and the pipes, so far as they were visible, bore every test. Notwithstanding, the house was haunted. Sewer-gas odours rose up in the most unexpected places. Inside six months the bath-room and closet were pulled up three times in the effort to find the leak, without discovering anything amiss. Then, providentially, something got wrong with the tubs. In taking up the floor under them, it was found that a space of six inches in the main house-drain had no regular pipe, but had been temporarily closed in with a sheet of bent tin. A workman hurrying to finish up the job had put in the tin rather than go back to the shop for a piece of pipe lacking. First and last, the householder paid something more than a hundred dollars for the fifty-dollar saving, besides risking life and health, and enduring much discomfort.

Good Plumbing

Perfect plumbing requires three separate sets of pipes, all running down into the main house-pipe which connects with the sewer. First, there are leaders for rain or snow water. Commonly they run outside, or are partly incased in the wall. Corrugated metal is better than smooth for them, since, if they fill and freeze in bitter weather, the rough pipe bears the strain better than the smooth. Next come the waste-water pipes, draining baths, sinks, and so on, and, last and most important of all, the soil-pipes, which carry off the wash of closets and urinals.

Leaders begin at the roof just well under the eaves. Waste and soil pipes run up several feet higher than the roof. Otherwise they would be a menace, and fill the house with sewer-gas. To each of them there is attached a smaller pipe, whose use is to secure what is known technically as back-ventilation. It goes out from the pipe below the lowermost plumbing fixture, and comes back into it above the highest. All along it is joined by other

small pipes, one from the crown of every trap. Thus, when a trap is flushed, the air in the pipe underneath does not struggle and gurgle through the water and finally pass into the room, but is forced easily downward before the flush-water, followed by clean air from the pipe in the crown.

All this is easily demonstrated practically. Fill a tall narrow bottle with water, turn it upside down, and watch the struggle of air and water as it empties itself. Refill it, again invert it, then break it slightly at the highest point. As soon as the break admits air, the water drops out magically without a gurgle or splash.

The best plumbing means that which is simplest, straightest, and least. The nearer the three sets of pipes come to running directly up and down, the better for health and purse. These are the pipe materials in their order of desirability: Lead, brass, wrought iron, galvanised iron. In all cities of the first class the use of earthen pipe inside a building is strictly forbidden. In New York no earthen pipe may be laid nearer than ten feet of a house-wall. Whatever the material, pipes should take the shortest course possible. If they run in any place horizontally, it is imperative to have them so supported that sagging is out of the question. The least small sag means a potential leak and plague-spot. This is especially true of the main house-pipe—the horizontal pipe into which the others empty, and which finally takes the house-waste into the sewer. This should have a fall of at least a quarter-inch in the foot. If storm-water is led into it outside, the area drains should be as carefully trapped as any other.

A most important adjunct of the house-pipe is the fresh-air pipe. Most commonly it leaves the house-pipe just inside the house-trap, which is placed close to the cellar-wall, and runs up and out, to reach open air, ending maybe a foot above-ground with a proper revolving-cowl.

But in the best and newest plumbing systems the fresh-air pipe runs to and through the roof, going a little higher than the end of the soil-pipe. Thus the flow of air through the pipes is sensibly augmented and made purer, yet all danger of fouling windows, either low or high, is done away with.

Traps

Traps are the vital points of all sorts and conditions of plumbing. The S-trap in some shape is now all but universal. The end and aim of a trap is to bar with a water-seal the entrance of sewer-gas, which is more properly sewer-air. Upon this point there is a lively dispute. Some of the wise men say there is a specific toxic exhalation from sewage, others that sewer-gas, so-called, is only air tainted with sulphuretted and carburetted hydrogen, carbonic acid, and various gaseous products of decomposing human waste.

But let nobody be lulled into false security. Every inch of inside pipe-surface shelters countless millions of bacteria, harmless so long as use keeps the pipes wet, but ready for deadly mischief as soon as the pipe dries. Hence the importance of flushing daily unused fixtures. Hence, too, the danger in occupying a house disused or closed without the most thorough flushing of all plumbing, and at least a twenty-four hours' airing. The very first thing to do when preparing to occupy such a dwelling is to set a short bit of candle upon the cellar-floor, and see how well it burns there. If it goes out inside an hour, open all doors and windows, start fires, and do whatever else is possible to set up a brisk circulation of air. Long-escaped sewer-gas divides itself, the light ill-smelling hydrogens going into upper air, and the heavy carbonic acid sinking. This stale carbonic acid has no distinct bad smell, but rather one lifeless and stifling. It is, in fact, identical with the "choke-damp" so fatal in coal

mines. Mixed with other lighter gases it becomes fire-damp, and may explode with more or less force if brought in contact with flames.

Harking back to trap-seals, the water-seal is the water which, after flushing, remains in the lower bend of the S, standing well above the projection, and thus permitting nothing gaseous to escape. This seal may be broken in several ways. Evaporation is one of them; therefore a trap standing in a very warm place must be flushed at least twice a day if not in use. Siphonage is another way. A third is too great a head of water, especially if the water carries along considerable solid matter. Thus laden it sometimes sets up suction strong enough to draw the water-seal over the bend of the trap. In the same way water poured from a considerable height may have force enough in flow to take the water-seal along with it.

Testing Traps and Plumbing

If the plumbing of a house or apartment is not above suspicion by either eye, ear, or nose, insist upon a test of it before taking possession. In cities law compels landlords to make such tests upon demand. House-owners do not need such compulsion. No person sane and sensible wilfully dares the dangers of futile plumbing. Testing is neither hard nor easy. For a whole system of pipes, there is but one thing infallible—the smoke test. To apply it one must have recourse to a master plumber, who is usually provided with special apparatus for forcing smoke into the house-pipe, but keeping it wholly out of the house. If it betrays its presence, even in the slightest, inside, then the pipes need a looking after of the most thorough sort. The smoke is specially acrid and pungent, so it cannot possibly be mistaken for any other odour. But where it goes, sewer-gas can follow. Commonly it has preceded the smoke, so the house should be well aired

before one stays in it even a few hours, much less undertakes to live in it.

Next to the smoke test comes the peppermint one. Get a four-ounce phial of peppermint essence, take care not to unstop it, nor let the least taint of it get abroad inside the house. Close bath-room doors, closet-lids, and fill every trap full of water. Then go upon the roof, open the bottle, pour the essence down the soil-pipe, and follow it instantly with a gallon of boiling water. Stay upon the roof half-an-hour so as not to take back the peppermint smell inside. Let another person go about at the end of fifteen minutes, and sniff carefully at all the plumbing fixtures. If there is a flavour of peppermint, it is a case for the plumber. If no odour is perceptible, every trap is doing its whole duty.

Where a single trap is suspected, pour peppermint in a higher one, holding the bottle inside a cloth, and spreading out the cloth over the trap-mouth so the smell shall be closely confined. Then stand beside the suspected trap for a few minutes, and note if the peppermint smell comes out of it. In testing a sink thus, put the peppermint in a big thin glass-bottle, one big enough to cover the sink-grating, stop the bottle very tight, set it over the grating; then spread the cloth over the whole sink, stretch a hand under the cloth, and break the bottle upon the grating, leaving the top to cover the opening. Open doors and windows for a minute, close them, go away, and stay half-an-hour. If upon returning the peppermint smell is strong, especially around the trap underneath, something is in need of immediate attention.

This is the way to tell whether or no a trap holds its seal properly. Pour in a gallon of water very gently, and after five minutes mark how high the water stands in the trap. Then flush it quickly and forcibly with the full head of the cistern. When the water is again still, see if it reaches the mark. If it does, the trap is working

right, but if it is even a half-inch lower, there is danger ahead—danger demanding the instant services of a competent plumber.

To test a trap for sewer-gas, hold a long lighted taper just over the water as the trap is flushed. If the flame is drawn slightly downward, the plumbing is properly ventilated; if it flutters sharply upward, sewer-air is rising through the flush-water. The taper flame, of course, will burn up; one must judge by any fluttering and swirling, such as would be occasioned by little currents of air. Where a slow, steady escape of sewer-air is suspected, try the candle test. Put a bit of lighted candle in a very low candlestick, and set it in the closet, either on the floor or close beside the trap. Leave it undisturbed for three hours, keeping the bath-room door shut tight all the time. Any considerable amount of sewer-gas will bring in enough carbonic acid to settle and put out the flame.

Another test, especially valuable for sink-traps and screened traps in general, is that of a silver spoon. Rub the spoon as bright as possible, then keep it for twelve hours close to the place suspected. Even a trace of sewer-gas will blur and begin to tarnish it. The flame test also applies in such cases, though less certainly, as the screen or grating deflects and breaks up the flow of escaping gas.

Proportion in Plumbing

Open plumbing is a boon little short of light and air. It enables one not merely to see the sort of traps used, and their location, but to make sure that proportion is properly observed. Proportion is all-important for many reasons. The chiefest of them is that a pipe too big for the water-flow is never properly scoured. Right here it may be well to set down that a four-inch pipe requires not twice but four times as much water for clean scouring as does a two-inch one, and, further, that friction, which

is the retarding influence in scouring, increases in the same ratio. Too big a trap is particularly dangerous. Unless every drop of dirty water is forced over, leaving the water-seal clean throughout, the trap becomes a miniature cesspool, in which waste matter continually decays and poisons the atmosphere. No competent nor decently honest plumber, much less one with a shred of conscience, thinks of using a trap bigger than the pipe it drains. But since there are in all trades artisans not over-burdened with either knowledge or scruples, it is well to take every chance of knowing the right thing, so one may insist upon having it.

Perfect flushing, which is the end and aim of good plumbing, requires a quick, steady flow of sufficient volume to wholly fill the pipe. Two gallons of water delivered in five seconds are far and away more effectual, both in moving waste and in cleansing pipes, than five gallons dribbled down through a minute. Yet a flow too violent is even worse than one too sluggish. Water falling down carries always the momentum of the whole head; thus a single gallon coming with great impetus may curl through and over the trap, leaving behind it a most insufficient seal.

Care of Plumbing

Every closet in daily use should be flushed once a week with at least two gallons of boiling water. Every other week a gallon of copperas water should be poured into it, and alternately with the copperas water a gallon of chloride of lime. (See Chapter on Disinfectants.) Use plain lime-water if no chloride is at hand. Monthly, but not oftener, dissolve a pound of washing-soda in a gallon of boiling water, pour the solution into the closet, let it stand fifteen minutes; then flush the closet with the full head from its own cistern, and follow with a gallon of

clear boiling water. The soda-water should stand in the trap just long enough to clean it thoroughly, but must be washed and rinsed away, so it may not attack and eat out the lead of the pipes and the solder of the joints.

Keep sinks clean in the same way, only use the soda solution fortnightly, and let it stand longer in the trap, as the grease will protect the pipe. Still, be sure to wash it out thoroughly. Plain clear lime-water is better for a sink than the chloride, which smells to heaven, especially in a small or ill-ventilated room.

To clean the traps underneath set bowls, put half a pint of ammonia to the gallon of soda solution. Twice a year at least put in the plug, fill the bowl to the brim with the ammoniated soda, and let it stand until the solution is level with the waste-vent. Tie a bit of absorbent cotton strongly upon the end of a coarsish crochet-hook, and, with the swab so formed, wash out the vent holes as far as it will reach. Use the same sort of swab to clean the drains of bowls, bath-tubs, and so on. The cleaner and freer running the vents, the better the sanitation.

Scour brass faucets with tripoli mixed in oil; clean silvered ones and all silvered fittings with whiting mixed to a paste with alcohol and ammonia. But in scouring all sorts of fixtures, be extra careful about keeping the scouring-grit out of the joints. Even the finest particles quickly cut away screw-threads turning many times a day. After scouring, also take care to let the water run a minute before catching it for use. Do not wash very sandy things, as spinach, potatoes, turnips, or radishes, under the faucet, but in a big pan—at least for the first water. In emptying the pan, let the water run off, then empty the sand at the bottom of it among ashes or garbage. A teaspoonful of sand washed down a lead-pipe wears and scratches it more than a whole hogshead of water.

Abuses of Plumbing

Those gentlemen, the plumbers, should build a statue to the goddess of Carelessness; that is, supposing such a deity sits in any pantheon. Certain it is, careful common sense will rout the plumber and his bill, the most dreaded of household spectres. Wise men have been studying this ever so long, to devise plumbing that would take care of itself. They have not succeeded, nor are they likely to do it. At least not without a revolution in mechanics whereby the tendency of fluids always to seek their own level is eliminated, and other things equally wonderful brought to pass. So long as physics remain nearly static, so long will it behove those who dwell in modern houses not merely to know all about their pipes and traps, but to look well to their usage.

In the care of plumbing, more than almost anything else, there are no trifles. A bit of rag, a string, a burnt match, or a wisp of hair from the comb, seems a very little thing; one that the pipes can carry off with no possible strain. Wait a bit. The rag or the string hanging over the bend of the trap may make itself a siphon to empty the water-seal—the water-seal which is the household defence against the deadly sewer-gas; and the rag so caught may keep on doing it unsuspected, week after week, until death and disease are rampant. If a faulty trap in a big country house had but been a little more faulty thirty years back, King Edward VII. would never have sat on the English throne. Scarlet, typhoid, and typhus fevers, diphtheria, and various other ailments, are all specifically "filth diseases" bred in nature's mysterious processes of making wholesome again human waste.

Match-ends ought to float away harming nobody, but are ever so much likelier to be caught by some eddy of flush-water, jammed into a crevice, and there take to themselves other solid particles until they form a clot of decay,

alike offensive and dangerous. Still, in the matter of mischief-making, nothing quite comes up to the wisp of hair, which quickly forms itself into a sort of strainer, catching and holding stuff that should pass by. Worse still, it commonly lodges in the most inconvenient place, hanging fast to the least roughness or the tiniest projection inside the pipe, and at last by accretion clogging the whole space. Hair has a most special affinity for bits of soap. Solid soap is another thing to be religiously kept out of pipes. Even very strong soap-suds do harm unless followed at once with a flood of clear water, preferably hot water.

Either coffee-grounds or tea-leaves will clog a sink-pipe. They will also wear it out very quickly. This partly by mechanical means, partly by chemical ones. Drain both very dry, and throw among ashes, unless the tea-leaves are kept for sprinkling carpets before sweeping. In a sink-pipe, even though all grease is kept out, they breed smells. Then in the sewer, where grease is inevitable, they will cake and clog distressingly, often to the point of making necessary a costly and troublesome unclogging.

Every kitchen should have its grease-can for refuse fat of every sort, even the scrapings of greasy plates and dishes. Empty this can twice a week in winter, every other day in summer. Let greasy water, as from boiling hams or corned beef, cool thoroughly, and take off the grease before pouring the water in the sink. All greasy vessels need to be rinsed with hot soda-water before washing. Let them stand some little time after the water is poured in; thus the grease becomes in a measure saponified, and is less apt to stick to the pipes, or cake upon top of the trap.

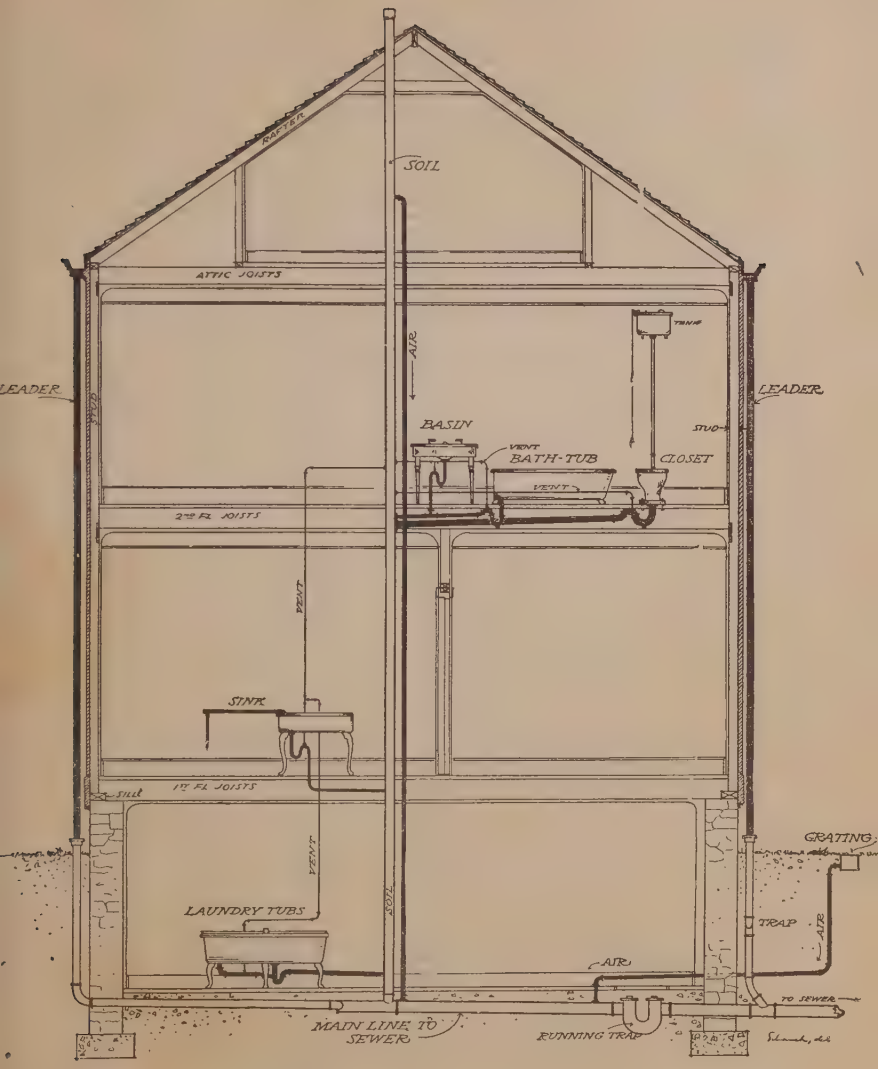
But neither grease, strings, nor tea and coffee grounds are the worst things plumbing is called on to encounter. Many careless folk do not scruple to throw into a closet

such things as grape-skins, cherry-pits, nut-shells, and carpet-sweepings. The last are the worst. Persistence in such practices means disease and a big bill for repairs. It may be accepted as axiomatic that nothing should ever be thrown into a closet that it is feasible or even possible to dispose of in any other way. Under no circumstances let anything go there that water will not dissolve. Pipes are made to carry off liquids and only such solids as may be reduced to a fluid consistency.

Location of Plumbing

Let the pipes run straight up and down, with as few laterals as possible. This is the first commandment. The second is like unto it—beware set bowls and special far-off baths. Even though portable baths are less convenient, they are ever and ever so much safer. No amount of money, nor the most sleepless vigilance, can insure that plumbing shall be perfectly safe all the time. So for delicate people, old people, and little children, it is almost imperative to provide sleeping-rooms that have no sort of connection with the plumbing anywhere.

There may well be a bath-room upon every floor, with water in a dressing-room back of or beside it. This lets the main pipes keep vertical. But be sure the drains of the bath-tubs do not go into the soil-pipes unless they have double traps. Be surest of all that there is no connection whatever between the flush-tanks of closets and the main water-supply. Of course there is bound to be a supply-pipe, but it must be so valved no taint can creep from it to the water. Waste-pipes from sinks must run separate from soil-pipes clean to the house-drain. If there are two sinks, as in kitchen and scullery, or pantry, it is well to have one several inches lower than the other, and the lowest set nearest the join with the house-drain.



HOUSE-PIPES—HOW THEY RUN

Nursery Sinks

Keeping nursery sinks clean and sweet is among the hardest problems in the care of plumbing. Milk, or milky water even, in small quantity daily, fouls pipes enormously, and breeds a most evil smell. That is unless the milky water is followed almost instantly by a flushing of hot soda-water, and at least once in three days is supplemented with a lime-water flush. Sea salt in the lime-water, a big lump to the pailful, makes it more effective. Heat it almost to boiling, and follow it in a quarter of an hour with clear hot water. This should keep the sink without odour unless very dirty water, as from washing napkins, is also poured into it. If possible, the nursery sink should be supplemented with a nursery closet and two small porcelain tubs. Clean the traps to all as directed for the sink. Nursery waste is in many ways the most offensive of all, and the hardest to get rid of.

Other People's Plumbing

In settling upon a home, one needs must look out for other people's plumbing. Surroundings often mean health or disease. When choosing an apartment, especially in a tall house, look out of the windows first thing. If soil-pipes upon lower adjacent buildings discharge just beneath the windows, let the apartment alone; it would be dear if one were paid to occupy it. Beyond all this, a ramshackle next-door neighbour may let loose enough sewer-gas to permeate the house-walls either side, and so make dangerous a new and trig erection. Then there are various manufacturing plants whose vicinity it is wise to avoid. These are among the most undesirable works: Alkali, brick, cement, brass, copper, iron, ammonia, and India-rubber. Each and several they poison the air around for at least a block. While they may not be so

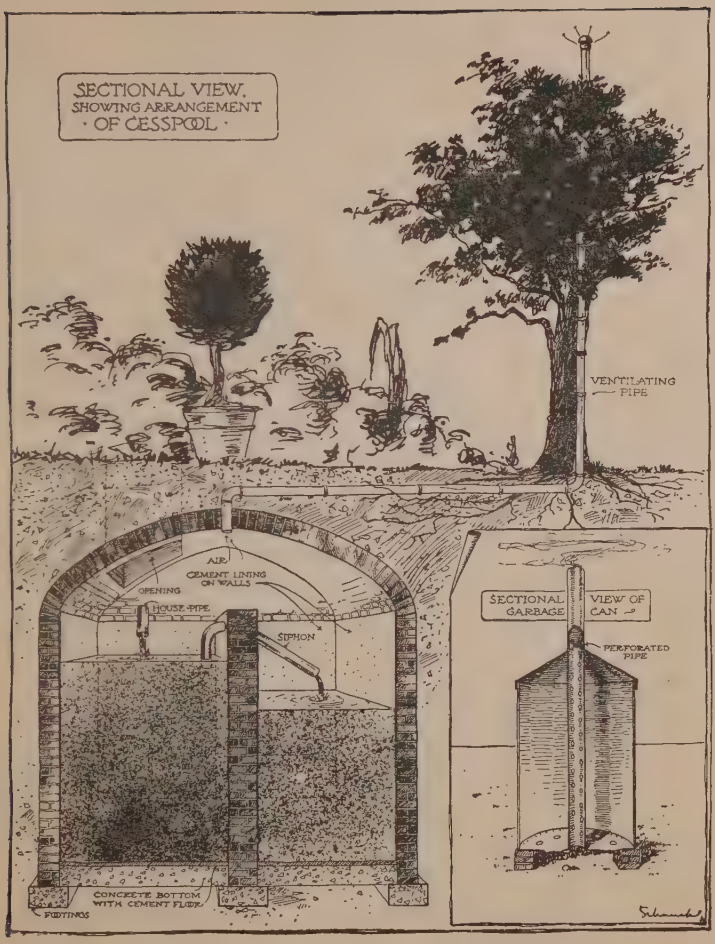
nauseous as match factories, glue factories, bone-burners, and slaughter-houses, they are fully as unwholesome. Upon general principles it is the part of wisdom to keep away from any sort of neighbour that sends out clouds of dust and smoke.

Cesspools and Earth-drains

Modern improvements often exist away from sewer systems. As to whether or no such existence is wise, each householder must personally decide. But it admits of no debate that the proper disposal of refuse is something to be well considered. With space and sand enough, the problem is not a hard one. A porous brick cesspool, laid unmortared in sandy ground and cleaned out twice a year, will do no harm to anybody, besides proving itself a very great convenience.

It must be used with judgment. Wash-water must be kept from it. Indeed, the whole inflow must keep some relation to the potential percolation. A cesspool six by twelve feet, with a mean depth of nine feet, and a division wall of brick across the short way of it, should be able to take a waste of ten gallons the head daily from a family of six persons or even eight. Set a syphon on the house-pipe side a little way below the top. The top should be bricked over arching, then covered with a foot of earth, and well turfed. At cleaning-time roll back the turf, make a good big opening over the inner compartment, and throw into it a bushel of quicklime. The steam from the slacking lime will bring up the foul air, and make the work of cleaning safe. It will be, further, much less offensive if, after the lime, a bushel of fresh charcoal, broken small, is also thrown in.

Cesspools in heavy, holding clay soil will be ever so much better for a ventilating pipe. It should run from the crown of the arch, but may be a little underground



CESSPOOL, WITH VENTILATING PIPE

GARBAGE-CAN CREMATORY

until it comes to a tree, or tall post, up which it should be carried to a height which will insure against contaminating the air about the house. Such a pipe is almost a necessity where seepage is slow, as the cesspool liquid remaining stagnant is apt to give off gases in quantity, and thus there may be explosions. In all cases where cesspools must be constructed in heavy soils, it is worth a considerable outlay to provide a drain. If the liquids can be led away to a safe distance, and the ventilating pipe established, cleaning will not be needed oftener than once a year, or, where the amount of waste is small, once in two years.

Privies and earth-closets can be kept reasonably inoffensive by throwing in a shovelful of quicklime and another of dry earth whenever they are used. Vaults of either need to be cleaned at least fortnightly. A light iron-hooped barrel sawed in half, and each half furnished with handles, makes excellent receptacles for the filth and dry earth. Two of these half-barrels, set in a shallow, well-walled vault, can be moved, emptied, and replaced easily and quickly. Work expeditiously, and bury their contents in clean earth wherever it is possible, so Nature's fine alchemy may make clean what is unclean.

Do not throw liquids, such as slops, dish-water, and soap-suds, upon the ground close about a dwelling. Provide a drain to take them away. The cost of it need be only a day's work and some lengths of tarred boards. Nail the boards together V-shape, and lay them point up at the bottom of a trench a foot wide, two feet deep, and sloping toward some sort of outlet. The sharper the slope the better, unless it is so steep earth will not stay in it. Lay stones upon the boards to hold them firm, and break the joints with shorter boards. Pack earth firmly over them. A drain so made will last for years, and take off a surprising amount of slops. At the drain-mouth set a length of six or even eight inch tile, slanting a little way

from the drain-course. Over this tile fix a tin or wooden hopper, with wire-net or perforated tin in the bottom. This to strain the slops, and save the ditch from clogging. Once a week scald out the wooden hopper, though, as it is likely to stand fair to the sun, it will hardly prove dangerous no matter how dirty.

The kitchen may have a sink-pipe emptying directly into such a drain. But the end of the pipe should be at least a foot from the hopper, so it may not lead bad air back into the kitchen. If the drain is fitted with six-inch tile, it may take away storm-water from the leads, with advantage to itself and the premises. It may, further, carry off wash-water, which, with only the boards, is apt to prove too much for it.

Waring's Bacterial System of Country-House Drainage

The late G. E. Waring, who may be called the father of open plumbing, hated cesspools and all their works. To take their place and do their work, he devised a drainage system which, given reasonable care, is as sanitary as it is simple. To understand its workings, it is necessary to know some things regarding sewage and the bacteria bred in it. Ordinary household sewage, including bath and wash water, contains in the thousand parts—998 of water, 1 of mineral salts, and 1 of refuse organic matter. It is this organic refuse which alone is fouling. If it can be decomposed before putrefaction, it is no longer dangerous.

To secure this decomposition it is only necessary that the sewage be exposed in thin films to the action of light and air. The air, the earth, the sewage itself, abound in bacteria, which attack the waste matter, tear it apart and oxidise it, the carbon, hydrogen, and nitrogen of the

waste combining with oxygen from the air to form carbonic-acid gas, water, and nitrous and nitric acid. The more perfect this oxidation, the purer the sewage-water becomes. It has been demonstrated over and over, by various filtration plants, that very foul sewage could thus be brought back to the condition of distilled water.

By the Waring system, all the household waste is led by pipes to a tank, either wholly or partly sunken, and open at the top. The tank must be either of brick, well set in cement, or glazed and tightly cemented, or of marble slabs. The smoother and more impervious, the better. It is two feet deep and twenty inches broad. The length is any multiple of two feet—four, six, eight, ten, or twelve —according to the flow it must receive. Four inches below the top, on the inside, there is an inch-wide shoulder in the side walls. These shoulders are to support wire screens, made in two-foot sections, strongly framed and easily removable. At the inlet end of the tank there is a recess fifteen inches square. In this a movable cage of wire-netting fits snugly. The cage is closed upon three sides with a ten-inch opening upon the fourth. The inlet runs into this opening, thus enabling the cage to strain out paper and all clogging solids. The cages are supplied in duplicate, so as to be removable for cleaning and airing. Their contents after turning out should be immediately dug into the earth, or covered with fresh earth if digging is impracticable.

The tank slopes a little toward the outlet end, which is fitted with an automatic siphon, discharging every twelve hours or twenty-four, according as it is proportioned to the inflow. From the syphon the waste water goes through drains, either surface or sub-surface, and leaches slowly into the soil. The drains must be so arranged that the flow reaches them in succession. Usually there are three sets, used consecutively. This consecutive use is the pith of the whole matter. It permits the drains and

the soil about them to dry out, giving the beneficent bacteria time to do their work. The drains must be so arranged that the flow is very gradual. It is, further, imperative to provide a light, well-aired surface-soil round about them. The ground they run over is best deeply underdrained. If it is warm, sandy, and very thirsty, underdraining may not be necessary, but with heavy loam or holding clay, it is indispensable. Surface drains may be simply gutters of finely broken stones or clean pebbles running between turfed banks, and returning one on the other if limited space or soil configuration demands. They must have barely enough slope to set up and maintain a sluggish current. This is also true of the tile drains; if the slope is too sharp, there may be unpleasant springs and fountains of sewage toward the bottom. Tile should be laid just below the grass-roots, either in earthenware gutters or upon beds of finely broken stone. All this, however, the sanitary engineer may well look out for. In use the tank should be uncovered at need—in hot weather, daily, the cage removed and cleaned, the walls swept down, and the mouth of the discharging siphon especially looked to. The tank's location will, of course, be determined by the size and configuration of the grounds. It may be screened by planting a shrubby evergreen ring about it. The ring should, however, not be so close as to impede sunlight and the circulation of air. Since sewage putrefies but slightly under twenty-four hours, and is seldom offensive before putrefaction, there is not much reason to fear ill odours unless the tank is very greatly neglected.

In light, well-aired soil it is estimated that one foot of pipage in each of the three alternating lines is sufficient for each gallon of tank-capacity. With a cold clay loam, three feet of pipe will be required to take up the same amount of flowage. The gates for securing alternate flowage must be strictly looked after. Where this is done,

the system is among the best yet devised to counteract the defilement of habitation.

Rubbish and Garbage

Fortunes have been lost and found in dust-heaps. Lives also are lost through them every year, in spite of modern progress. Indeed, it is not too much to say that every carelessly managed ash-heap or garbage-pile is a potential poisoner. City folk have little concern of this sort; the city itself takes away garbage daily. The lesson of such taking away is one the whole people may well lay to heart. If, through storm or stress of weather, collection is clogged and garbage accumulates, there is an instant and perceptible rise in the cases of "filth disease," and a corresponding increase in the death-rate.

Wherefore it is well to impress this golden rule for dust-heaps. Dust, be it understood, is a generic rather than a specific term, and, as here used, applies to whatever is thrown away. Wherever it is possible, waste should be turned to ashes. Things which cannot be burned need to be dried, and kept dry. Concretely applied, this means burn paper, especially greasy paper, or dirty card-board of every sort, rags, straw, excelsior, hair, lint, carpet-sweepings, feathers, bones, and old leather. For the most part the burning can be done in a stove, or grate, or range, especially if one is wise enough to burn up things right along, thus preventing cluttering. But where the stove or range is out of the question—as when gas or oil is the fuel—it pays to make things burn themselves in a crematory that any tinsmith can make at a very low cost.

The foundation of it is a tall galvanised-iron garbage-can. Have half-a-dozen inch-holes cut in the bottom of it well toward the edge, then inside the ring of holes have a length of perforated iron pipe riveted on. It should

stand several feet higher than the cover, and be perforated from the bottom upward, nearly to where the cover touches it. The can-cover must be cut in two, and each half so hollowed as to fit around the pipe. It may be hinged at one end, and fastened with a hook-clamp at the other. In use set the can in a vacant space outdoors, supporting the bottom on bricks, and piling the brick high enough to get the hand well underneath. Put whatever is to be burned inside, between the pipe and the can, close the cover, then touch a match to it through one of the holes in the bottom. Such things as leather and bones need to be mixed through lighter stuff, which in burning will set them well afire. If there is sufficient garden space, it is better to bury the leather and bones two feet down, where the roots of a choice plant can reach them. But with only a little plot, maybe in grass, the ashes from the can, which are among the very best fertilisers, will be handier and more valuable.

Fruit-skins and pits, potato-skins, pea-hulls, beet-tops, the refuse of salads, indeed, every sort of vegetable waste, ought to be spread out thin and dried through and through before going in the dust-heap. Where a horse, or cow, or goat, or even a pig, is kept, such things will give little trouble. A thrifty pig, indeed, may be made a sort of savings bank for all sorts and conditions of waste edibles. It is the same almost with fowls, which will eat up almost every sort of table-refuse clean with only a little care in preparing it for them. Still, when all is subtracted, much remains that perforce goes to the heap. But never by any chance let a dust-heap get either wet or greasy.

Grease of any sort had better be turned into soft soap. (See Chapter on Insecticides.) Water is the life of bacterial action. Harmful or harmless, those mysterious creatures depend upon moisture for multiplication. Keep some sort of shelter for the dust-heap. Do not build it

upon the ground. A big box with a light, tight, movable gable-roof, and a narrow door toward the bottom, is a good refuse-holder. So is a light barrel, with a batten cover, and swung between two posts so it can be easily emptied. If skins and stalks are burned after drying, the box or barrel will need emptying about every six weeks. If the stalks go in in bulk, it should be emptied fortnightly. Weekly it should have a quart of quicklime and a handful of broken charcoal thrown into it. Thus treated it may stand behind a light trellis at the very edge of a flower-bed, or border, and never in any way betray its presence.

Cabbage-leaves, potato-parings, and their ilk, massed together in the natural state and left to decay, will breed pestilence nearly as quickly as animal waste. If such massing is unavoidable, the heap should be mixed with quicklime and charcoal, and sprinkled daily with copperas in powder. If the stench is overpowering, drench the whole heap with a strong chloride of lime solution, or dissolved permanganate of potash. Covering decaying stuff with clean earth is always advisable. The trouble is that in so many cases there is no clean earth at hand.

Fine ashes help to keep the dust-heap wholesome. Cinders had better be sifted out, and saved to help in draining paths. A layer of cinders six inches deep, beneath a three-inch coat of either shells or gravel, will help to keep a path free of grass and dampness. But, while the cinder-gathering goes on, do not keep them in an unsightly pile plain to view. Boxes and barrels are to be had almost anywhere for the asking, and use of them makes for so much that is desirable in a home.

Chapter *THIRTEEN*

The Water-Supply

NO other single factor in household arrangements is so vital to health and comfort as the water-supply. Good water is assuredly among the best gifts of nature, bad water the source and breeder of uncounted ills. Paradoxical as it sounds, the purest water is by no means always the best. Limestone water, for example, builds up the bones in growing animals, children not excepted; further, it is to the carbonic acid held in solution that spring water, indeed, any fresh and living water, owes much of its charm. Distilled water is notoriously flat, and unpalatable. So is boiled water, yet boiling renders water which is not above suspicion reasonably safe. Boiling drives off the carbonic acid quite as effectually as it kills deleterious germs.

Hard Water and Soft Water

Water is formed of oxygen and hydrogen, chemically combined, yet has the curious property of taking to itself more oxygen mixed with nitrogen in the form of air. This in addition to the carbonic acid, of which water commonly absorbs about its own volume. All chemically pure water is soft. Rain-water is not quite chemically pure, in that it absorbs traces of ammonia in falling through the air. Distilled water received in sterilised vessels is the only strictly pure water. But the constant

drinking of distilled water would be neither wholesome nor pleasant.

Water has a strong solvent power, somewhat proportioned, however, to its purity and the amount of carbonic acid it carries. For practical purposes, rain-water, the water from mud-bottomed ponds, marshes, and streams running through sands neither salt nor alkaline, may be accepted as soft. What is known in country parlance as "freestone water," though less hard than limestone water, is not soft, carrying as it does a sensible percentage of mineral matter derived from granitic rocks and soils. This mineral taint is, however, so inert it rarely gives trouble. It is the water well charged with carbonic acid, and flowing over or through either limestone, chalk, or gypsum formations, which dissolves enough of active mineral salts to need softening treatment.

Pure limestone water is eminently wholesome for drinking. But in the laundry it is another proposition. The lime in the water combines with the soap, making hard, curdy flakes all over the surface of it. Until the lime has been neutralised, indeed, it is impossible to make good suds; and, even then, the curdy deposit makes trouble upon the wash and the tubs. Wherefore, with any water which sets up this curdiness, it is the part of wisdom to soften each tubful as soon as drawn with either a cupful of lye, made from wood-ashes and strained, or two tablespoonfuls of a strong pearl-ash solution, or a pint of hot soda-water, strong enough to slip between the fingers. Of course either soda or pearl-ash can be used in the lump, but the action is not so quick, nor anything like so even and so effectual.

Boiling also throws down the lime; hence the scurvy, whitish deposits at the bottom of tea-kettles and boilers. Clear lime-water in proportion of one gallon to ten softens very hard water—possibly on homœopathic principles. It is the best of re-agents for drinking-water and for that

which must be used in cooking, as well as for washing delicately coloured fabrics.

Water, either soft or hard, dissolves lead; in small measure, to be sure, but enough to count in the long run. Hence the importance of letting water run some little time from the pipes before using it either for drinking or cooking. Where water from the pipes is turbid, or even slightly muddy, it is a good plan to strain it by tying a small bag of coarse loosely woven flannel, very strongly made, over the mouth of the faucet, and changing the bag daily. In washing this does much to keep the clothes white through seasons of bad water. Wherever there is a city or village water-supply, such periods may be counted on some time in the year.

Springs, Wells, and Cisterns

With a municipal water-supply the most one can do is to modify or minimise evils. But in more than half the homes of these United States the water-supply is absolutely subject to control. More's the pity, one is tempted to say, recalling many prevalent practices. Very nice people, and wise upon many points, are too often shockingly careless of possible taints. Apparently they think the earth is a great all-potent filter—whenever water goes through it, it leaves all traces of impurity behind. Nothing could well be more mistaken. The earth *is* a filter. Indeed, it is safe to say that throughout the unreckonable ages every drop of water on the planet has been fouled and made clean many times over. But the making clean is a tedious process—much too tedious to be trusted, with life and health in the balance. It cannot be said too often nor too strongly that there is no alchemy in earth or gravel potent to remove the taint of decaying organic matter, either animal or vegetable.

No well sunk in a populous space yields water above

suspicion. That is, excepting always artesian wells, or driven ones that go down several hundred feet, and are securely piped against the infiltration of surface-water. Something also depends upon the soil. Sandy earth permits the surface taints to go down very much deeper than clay. A stiff, holding clay, indeed, will give water less contaminated sixty feet down than will a sandy loam at the depth of a hundred. Neither clay nor sand extends anything like so far below the surface; but all the water in water-veins at some time or other falls upon the surface in the form of rain or snow, and seeps gradually down through the upper soil. Sandy soils are so much opener, the passage through them is more rapid; besides, the sand particles do not catch and hold ammonia and its compounds as do the particles of clay.

Water from what is known as a seep-well—that is to say, water gathered from the inflow of many tiny trickles—is almost sure to be polluted, unless the surface about it is fairly virgin. If much surface-seepage is encountered in well-digging, the shaft should be abandoned, and a new location chosen. The perfect well is one going down through clean firm soil to a depth of at least forty feet, and there piercing a water-vein bold enough to fill the well-bottom to a depth of ten feet, but seldom rising above that. If the vein flows just upon top of a rock-stratum which can be blasted to provide a deep, clean rock-cup, then the location is ideal.

But have a care whence such a vein flows. If there is a graveyard, even a small one, lying higher than the well-seat anywhere in the vein's water-shed, the well cannot be too quickly filled in and abandoned. Graveyards are among the deadliest of all well-poisoners—a fact that is in itself a very sufficient argument for cremation. If there are stables, or slaughter-houses, or greenhouses, or even highly manured market-gardens, over the vein's gathering territory, the water will very likely be bad.

Leakage from sewers, cesspools, surface wash from privy vaults, or drains carrying away household slops, are all things to be well looked after. But all such things may be disregarded if a well is sunk through a stratum of sound rock to reach a water-bearing formation lying below.

Any sort of well should have a rock or brick wall laid in cement, and cemented all over the inner surface. A cast-iron pump, cement-bedded, with no cranny nor crevice for creeping intruders, will insure the water's keeping pure all the year round. It will further insure it against pollution from bad air—the choke-damp, which, heavier than the upper air, sinks into low places, and stays there until violently expelled.

In alluvial regions, or those thickly populated, cisterns are far and away better than wells. They may be under or above ground, preferably under, should be of suitable dimension, and bricked up from the lowermost cup to the arch. The arch should come a foot below the surface of the earth, and have a shaft, a foot and a half high, running up to receive the pump fixtures. All the inner surface of the brick-work, and the outer one as far as exposed, should be cemented, using the very best quality of hydraulic cement, which hardens under water. Have the pump set very tight in the top of the shaft, cover the brick arch with earth, and sod the space over it compactly. Provide a tin or earthen trough open at one end to catch waste water under the pump-spout and take it safe away.

The inflow-pipe may be short or long according to location. Where choice is possible, it is well to set the cistern several yards away from the nearest house-wall. The inflow-pipe should run to it below the surface-level, three feet down, if possible. It should be of vitrified brick laid in cement, and cemented smooth inside and out. Where the water comes into it, there should be a brick receiver, either square or round, cemented within and without, and

rising two feet above-ground. This must be big enough to hold a sufficient filter. The bottom of it must be level with the inflow-pipe, which should fall a little in its course to the cistern. Set a coarse grating across the mouth of the inflow-pipe, or, better, a double section of hollow brick.

For the filter, first cover the bottom of the water-cup with clean rolled pebbles, using none less than two inches through. The layer ought to be six inches deep. Upon top of it put a layer of hard-wood charcoal, broken to egg-size, and screened free of dust. This should be at least three inches deep, with three inches of small pebbles over the top. Then, by way of finish, put over the pebbles big lumps of charcoal mixed with massive rolled flints—so massive the plunging roof-water will not be able to displace them. A filter so made will be good for five years, after which it should be overhauled, the stones washed clean, and the charcoal renewed.

With very big cisterns and a tremendous inflow, it is easier to use the wall-filter. This is of porous brick, laid unmortared, so as to divide the cistern about equally from top to bottom. Then the cistern-shape should be a long ellipse rather than round. The inflow-pipe comes in one side the filter-wall, and the pump is set upon the other. Where much water is needed, so much that all rain-water must be stored for use, the wall-filter is almost imperative.

No matter where the inflow-pipe mouth may be located, there must be a movable pipe to connect it with the leads. Stout tin well soldered, in elbow shape, with rings for easy handling and an inverted hopper-mouth, is the best. It is equally important to have a waste-water way close beside the filter, through which surplus or undesirable storm-water may run off. Eternal vigilance is the price of the best cistern-water, which is far and away the best of all water for either drinking, bathing, cooking, or laundry work. Even a small roof-surface supplies

enough water of the right sort for a fair-sized cistern if it is properly husbanded.

Snow-water from the roof of a country-house is rarely objectionable, unless the snow has lain so long it has become smoke-tainted. In towns or suburban places keep out snow-water, and let no rain-water in, until the roof has been well washed off. If possible, catch no rain before November, nor after March. It is, further, important to consider the sort of roof. Painted or stained shingles will not furnish good water. Painted tin, after a rain or two, is perfectly safe. Steamed and sawed shingles, unpainted, need to be seasoned and rain-soaked a year before saving water from them. Tile roofs, slate roofs, and hard-wood shingles unstained, shed rain-water very nearly in the same condition it fell.

With a cistern, beware of house-haunting birds such as pigeons, martins, and swallows. Each and several they will foul gutters sadly, often trying to build in them, and always perching upon roofs to rest and preen. Swallows are least objectionable, pigeons worst of all. A cote all their own is no protection against their defilement.

A last word as to gutters and leaders. The very best heavy tin is none too good for them. See that they are properly put up, and of sufficient size. See also that, after severe winter weather, they are still true and in place. Wooden gutters should not be used even upon a barn, especially if the water of it is to be drunk by milch-cows. Whatever taint is in the water will be passed on to the milk. Yet such is the perversity of miseducated palates, cows, indeed, any animals, accustomed to bad water, will refuse to drink good water unless driven to it by thirst.

Wind-Mills and Force-Pumps

Almost the whole face of these United States is underlaid with a flow of pure water, at distances varying from

three hundred to fifteen hundred feet. Hence, wherever there is enough of enterprise combined with a little money, the question of a pure water-supply is easily answered. The first cost of driven or artesian wells is not great, and, once the well is down, there is an inexhaustible supply ever after. Nor is that all. American ingenuity and enterprise have so cheapened machinery, it is easily possible for persons of ordinary means to have modern improvements in their houses, by the help of a wind-mill and a force-pump.

Circumstances and location govern the cost, but in a general way one may estimate it at from three hundred to fifteen hundred dollars. The gain in comfort, convenience, and sanitary security is enormous—quite enough in the course of a single season to warrant the outlay. In many of the home industries, such as fancy dairying, rose and violet culture, and small-fruit growing, wind-mills and water have proved the corner-stone of success. If he is a benefactor who makes two blades of grass grow where earlier but one was possible, what shall be said of a contrivance which makes possible grass-plots and flower-beds, not to name bath-rooms, where before there were none?

Spring Water

Spring water knows no medium; it is either very good or very bad. According to authority, the standard for water is this: "Free from colour, taste, or smell; cool, soft, bright, well aerated, and wholly free from deposit." But even this must be accepted with a qualification. Spring water may show every characteristic named, yet be unsafe, if the stream gathers head in a marshy space, especially a marsh that receives, in times of high water, flood-water contaminated with either sewage or the wash of inhabited and highly manured lands.

Filtration through the various strata takes away smell and colour, yet may leave behind subtle poisons. A spring coming to light after channelling under cultivated fields is commonly something to let alone. Contrariwise, one breaking out boldly from beneath a massy bluff, or gathering its waters in untrodden wilds, is safe as it is refreshing. A landowner should always have respect to a water-source, and in clearing fields, or grading, or draining, leave it as nearly undisturbed as possible.

Some Water Tests

Here are a few simple tests which even the wayfaring summer boarder or sojourner may apply, oftentime to the saving of health. Put a pint of water in an earthen vessel—a flattish one is best—evaporate it quickly, and scrape the dish clean of any residue. If the residue is white and powdery, it means lime or gypsum, hence the water is hard but safe. A whity-green or whity-yellow gummy residue is suspicious. Burn it. If it turns black, giving out the smell of burnt feathers, the water is contaminated with animal refuse, and a likely breeder of typhoid.

Another test is that with permanganate of potash, a chemical which, when dissolved, gives to water a beautiful purple colour. Put the water to be tested in a white earthen cup, add a teaspoonful of weak sulphuric acid, stir with a bit of glass, and pour in the dissolved permanganate—the solution must not be strong—until the water in the cup turns a rosy red. Cover with glass, and set aside a few minutes. If the colour has faded, then add more permanganate. Very much contaminated water will bleach out the potash colour twice or even three times. Still, it must be remembered that traces of iron, or peaty deposits in water, will have the same effect as sewage. Where iron or peat taint is likely, test the water further

in this fashion: Fill a clean glass with it, add a little nitric acid, and one-fourth as much lunar caustic in solution. Shake all well together, then stir with a slip of clean glass. If the glass comes out only slightly milky or clouded, the water is safe; it has only the normal grain of salt to the gallon. But if the milkiness is pronounced, thick, white, and curdy, it means too much salt, which in turn means sewage contamination. The salt of food is commonly or, rather, chiefly eliminated in urine, and thus passed back into the water-flow. Water which bleaches out the permanganate, and afterward responds to the test for salt though only slightly, is apt to be fouled with stable refuse, or some other sort of animal waste, rather than sewage.

Purifying Water

The name of filters is legion. For the most part one may like them, each and several, for several virtues, without finding any which combines all. One that is cheap, good, and reasonably efficient, withal easily kept clean, is made thus. Get first a five-gallon earthen jar, and a length of drain-pipe big enough to fit the mouth of the jar. Cut some rounds of coarse loosely woven flannel three inches bigger than the end of the tile, make an inch-hem all round, and run in a stout drawing-tape. Tie this tape over the swell at the end of the tile, then set the tile over the jar mouth. Now lay inside the tile a cheese-cloth bag, big enough to cover the whole bottom, and filled with charcoal broken to the size of a small pea. Pour water in the pipe—in draining through it is well filtered. Change the charcoal bag every day. Scald and dry the bag out of use, and once a week empty the charcoal into a sieve, and pour boiling water well through it.

Water so filtered may be afterward boiled, and drank with safety, no matter what its original condition. Boiling alone drives off many taints, besides killing all manne

of bacteria. Since it also drives off the life-giving air and gases, boiled water ought to be poured at least three times from one vessel to another before it is drunk. The higher one vessel is held from the other, the better. Another way of making boiled water more palatable is to acidulate it very slightly with, say, a teaspoonful of lime-juice to the gallon, then at the minute of drinking add two grains of soda bicarbonate dissolved in a little water. This will furnish about the normal amount of carbonic-acid gas.

In times of flood, water of every sort is apt to show traces of mud. Draw it, and let it settle before attempting to purify it. Then, if there is an earthy or leafy taste, put in a little alum, say two grains to the gallon of clear water, and filter well. The alum will combine with the foreign matter which is slightly albuminous, and be rendered wholly inert, forming a precipitate the filter will remove. Clean, fresh oak-chips are an even better astringent than alum. Fill up the drain-pipe filter with them, using fresh ones every morning, and pour on water as fast as it runs through.

Water ill-smelling and covered with greenish scum may be made safe by this simple expedient. Tie a lump of quicklime as big as the fist inside a clean cheese-cloth, and lower it in a bucket of the water. In slacking, the lime will develop steam enough to run through the water, driving off all foul gases. As soon as it ceases to hiss and bubble, take out the lime, let the water settle half-an-hour, then skim well and pour off carefully, leaving at least two inches depth above the sediment. In travelling, especially in roughing it, one often finds water of questionable quality. A pinch of either magnesia or prepared chalk, well stirred into a glassful, may prove a help and safeguard. Let the water settle, and drink only two-thirds down. The slight alkaline taste will not be disagreeable. If possible to pour the water off the sedi-

ment, and mix it with a very little good brandy or whisky, it will be both more palatable and more reassuring.

If alkali water is encountered, dash it very lightly with some vegetable acid—vinegar, lime, or lemon-juice.

Stills and Strainers

There is one certain, if troublesome, remedy for the worst possible water-supply—the water-still, which can be bought for the sum of ten dollars. It is made both in copper and aluminum, and can be used upon either a range, a gas-stove, or oil-stove, or set upon a rude camp furnace of stones and clay. All it requires, indeed, is a flat surface sufficiently heated to boil water. The still is in three parts, and takes up hardly more room than an ordinary vegetable steamer. First, there is a broad flat vessel for the boiling water, with a condenser, also broad and flat, fitting the top of it. Above the condenser is the feed-water, which keeps the condenser cool, and, as the lower chamber is emptied, passes down automatically to supply the boiler. There is a pipe with a stop-cock outside the condenser, so water can be drawn from it without interrupting the distilling. All the care needed for such a still is to keep the feed-tank full, see that the heat is steady, and now and then to empty the condenser.

Brackish water, marsh water, or that from contaminated springs and wells, is made perfectly wholesome by distillation. The boiler should never be allowed to dry out. If the still is in constant use, empty the boiler at least twice a day. Three times is better. And once a day, preferably in the morning, free the boiler rim and bottom of all adherent sediment. If it is salt sediment it can be scraped off; if lime or any sort of mineral is deposited, remove it by rubbing the boiler with a little strong vinegar. Rinse very well before setting the still to work. A clean oyster or clam shell laid in the bot-

tom of the boiler will catch and hold a large part of mineral deposits.

Strain all water before it goes in the feed-tank. A cheap and handy strainer is made thus: Take a round of stout galvanised wire a little bigger than a bucket-top, and sew doubled mosquito-net strongly over the wire. In use lay the net circle over the bucket, and either pump or pour the water through it. Have several such strainers, so one may be always drying; and, once a week, drop them all in boiling water for five minutes, shake them vigorously about, drain, and dry well.

Distilled water is always flat. It can be made more palatable and more wholesome by the use of lime-juice and bi-carbonate of soda. Indeed, the juice of a fresh lime alone in a glass of water first thing upon rising is among the best preventives of malaria and stomach disorders, especially those due to changes of water. Summer travellers can do no better for themselves than to take along supplies of lime-juice and pure grape brandy. A dash of either in the drinking-water is a safeguard not to be despised.

People of gouty tendencies, whose water-supply is strongly calcareous, will find it well worth while to distil all they drink. Gouty pains come from the deposit of calcareous matter around joints and along natural passages. Distilled water acts by prevention. It is also efficacious against the calcareous deposit in veins and arteries, which is among the most unmistakable signs of advancing years.

As to Water-Pipes

Remember always that very hot water eats and wears out pipes much faster than water of moderate heat. Hence watch the boiler. If it begins to sing, set the hot-water faucet running, and keep it running until the

boiler feels cool to the back of the hand. But it should not be allowed to get singing-hot. Feel the boiler after breakfast, and again after dinner; if it burns the back of the hand, let off at least half the water in it.

It is quite as important to keep the boiler and hot-water pipes clean. No matter what the source of water-supply, there will be more or less sediment in the boiler. Once a month, at least, turn off the water—there is a special tap for the purpose—then open the faucet, and let all the water possible run off. When it ceases running, set a tub underneath the boiler, and open the tap at the bottom. When all sediment has run out, turn on the water again, and let the inside of the boiler have a good rinsing. Turn off the water again, close the lower tap, and again turn it on. There must be no range fire while all this goes on. Fire without a free circulation through the water-back would mean a dangerous explosion.

In very cold weather, pipes in cool apartments may be saved from freezing and bursting by leaving the taps running a little. The running must not be at full head, nor so faint as to freeze and clog the vent. A gentle, steady trickle is best. With spring faucets, wire back the handles. If a pipe freezes, do not try to thaw it out violently. A good way is to wrap the frozen pipe thickly with woollen cloths, and lay over them cloths wrung out of boiling water. Cover the hot cloths with dry ones, and as they cool renew them; or a warm flat-iron can be held over the cloths. This is only worth while where there is a short exposed length frozen. Heat, as of flame or coals, applied to a pipe considerably frozen may generate steam enough in one place to cause an explosion when it runs against the part still frozen.

Do not try to protect outdoor water-pipes either with ash-banks or by covering them with manure. Both substances eat and honeycomb the pipe, to say nothing of

the danger of contamination. Outside supply-pipes should run through brick conduits, well furred inside with clear half-inch pine stuff. Have openings in the conduits for ventilation in mild weather; in freezes see to it that the openings are tightly closed.

Chapter *FOURTEEN*

Lighting and Heating

IN the matter of light and heat, avoid extremes. But as between too little and too much of either, choose always too much. Light can be tempered, heat modified. Cold and darkness are negative qualities, but ill and costly to banish.

Lights and Lighting

Almost half the home-makers nowadays can rely upon lights from the outside. Electricity, municipal gas-works, private gas-works, and water-gas household plants, so abound, the lamp and the candle hide their diminished heads. As to either gas or electric light, all that can be said is in regard to location and economy. Side lights of either are much better than staring chandeliers, unless the room to be lighted is much bigger than the average American house affords. Good gas, unvaryingly of twenty-four candle-power to a standard four-foot burner, is a most economical light wherever it can be bought for a dollar the thousand feet. Above that price it is cheaper than electricity, light for light, but relatively dearer, in that an electric light of standard brilliance gives almost half as much again of luminosity as the same size gas-flame.

"*Matches are cheaper than gas.*" This should be printed in big letters, and stuck up in every kitchen and bath-room. Freely translated it means that lights should

be turned out the very minute they are no longer needed. The same is true of gas-stove burners, whether for cooking or ironing. Upon the same principle never light a jet until it is needed. True, it may consume but a trifle in excess of the normal amount, but it is the many mickles which in the end make up a disagreeable muckle.

Do not read by a light directly overhead, especially one that flickers. Buy a drop-light whatever else is done without, and, if possible, provide it with some one of the patent mantles, which give a flame so much whiter and steadier than the common burners. Shade the flame so the light shall fall upon the book, or work, or whatever is in hand, but miss the eyes. Let the light come over the left arm or shoulder. Do not burn it at full head. Experiment until the proper pitch is found. Always turn off a drop-light by the cock which supplies the flexible tube of it. Otherwise the pressure of gas in the rubber will most likely cause a leak. Once a fortnight, at least, take off the drop-light tube, and hang it out to air. Thus it will breed no gas odours to be mistaken for gas leaks. In case of a leak, either known or suspected, do not strike a match nor carry a light into a closed room to look for it. As soon as there is a perceptible smell of gas, open doors and windows wide. Illuminating gas mixed equally with air is among the most explosive compounds known. Find out where the stop-cock stands, so that in case of fire or accident the gas-supply may be quickly shut off.

A gas-jet which burns with a whistling noise is giving out more gas than it burns. Turn it down until the whistling stops. See that the tips and burners are cleaned and renewed at need. See also that every key stands square, and be especially sure that none of them turns clear around. At least one-half the fatal gas accidents are traceable to keys which either turn on the gas thus in the act of turning off, or to those which work so

loosely they can be dragged open by accidental contact with a hand or sleeve. Flat-top burners are generally better than round-topped ones, as they prevent the flame from spreading to break the globe. Globes of clear glass, or softly tinted, are best for the eyes. It goes without saying they must be kept clear and clean. Dust them out every week, and wash them every month, taking care to wipe them very clean, and thoroughly dry. Take care in handling gas fixtures not to lean upon them nor swing against them. Wash them clean now and then, but do not undertake polishing them.

Remember a soft clear radiance does not hurt or tire the eyes one-half so much as a white steely flare. Therefore, soften the most part of electric lights with bags of thin softly tinted silks drawn deftly about the bulbs. Try colour after colour, and use that which most rests the eyes. Beware of working too close to an electric bulb. In some cases it is said the light develops an X-ray property, and takes off the hair. Electric lights are on many counts especially desirable in closets, store-rooms, and cellars. Wherever possible such light should be arranged to turn off and on by the closing and opening of the door.

Lamps

All said and done, neither gas nor electricity can quite come up to perfect lamp-light. For perfect lamp-light, the first requisite is good lamps; those with central-draft burners are far and away the best. The student's lamp with the Rochester burner is as near perfect as anything likely to be made in lamp shape. The price of such a lamp runs all the way from two-and-a-half to twenty dollars. The difference is one of finish and ornamentation. Choose a lamp with a broadish solid base rather than one top-heavy, and given to oversetting. Look also at the size of the burner; unless it is big enough to hold

without packing a good-sized wick, the lamp will give a poor light. The oil reservoir had better have no other opening than that which admits the wick. Those with a special cap for pouring in oil are convenient, and, in careful hands, safe. But the mass of folk are in danger of being tempted by them to fill up a lamp already lighted, or else to leave wick and burner for so long undisturbed, both become clogged and gummy.

Do not let a lamp stand with a little oil in the bottom. Do not even light one that has stood partly empty for a week. The best oil vapourises under some conditions, and the vapour is highly explosive. Every burner ought to be supplied with an extinguisher, but where the extinguisher is lacking, do not blow down a chimney to put out a lamp-flame. Especially not if the lamp has been burned for several hours. Ninety-nine times in the hundred the lamp may be blown out safely, yet at the hundredth the flame may come in contact with gas, and do no end of damage.

Turn down a lamp-flame one-half before moving it from one room to another. But do not leave it low enough to smoke or smell. It will do both if left with flame showing dim. If the light must be moderated, either take the lamp outside or shade the flame, half-shrouding it, rather than turning it too low.

The vital thing about a student's lamp is to set and keep it level. If the oil-tank is for even a minute a little higher than the burner, the burner will be overflowed, with disastrous results. In filling such a lamp, be sure not to leave air-bubbles upon top of the oil. Such bubbles have a knack of choking up the narrow supply-pipe, and making the light dim and yellow.

Next to good lamps comes good oil, properly kept. The best oil is as white and clear as spring water, and will evaporate after a while, leaving no stain.

Oil keeps best in glass, at a temperature between fifty

and sixty degrees. Tin-cans are light, but in steady use given to springing a-leak at the most inconvenient seasons. There is a glass oil-can in an open-work tin-holder, with bail and handle, and coming in various sizes, that answers admirably in careful hands, or where it has only to go to the corner grocery for filling. Folk who must fetch home their oil-supply in a farm-wagon, and presumably over rough roads, will find nothing else quite so good for holding it as a five-gallon demijohn, with its wicker-work still staunch. The demijohn is of manageable size, does not overset nor break easily, and never, never leaks. With reasonable care it will last a lifetime, and still be a heritable asset.

Get the very best wicks, soft, of loose, rather coarse mesh, and big enough to fill the burners without any crowding or packing. A wick too small admits air into the oil-tank, thus setting up vaporisation. Further, it leaves a space for the passage of flame downward if a lamp is improperly blown out. The proper way, be it said, is across the flame, not from over-head. Buy, in bunches, wicks of sizes to fit every lamp in the house. Put all the bunches in a porcelain kettle, cover them with strong vinegar, bring the vinegar to a boil, and set where the kettle will keep warm for three hours. Drain out the wick-bunches, dry thoroughly, and keep away from dust. Wicks thus soaked and kept clean, both before and after going in the burner, almost never smoke. In use trim the wicks once a week, but always very lightly and evenly, taking off the snuff—the burned part—but never any charred wick. Some excellent housekeepers, indeed, never put scissors upon a wick. Instead they turn the wicks up an inch, then, with a coarse cloth held over thumb and forefinger, rub and pinch off the snuff. Whether cut or pinched, the main thing is to leave the wicks without tag-ends or jagged places. Tag-ends and jags mean always smoked and broken chimneys.

There are chimneys and chimneys—all breakable. Some are supremely so in the hands of the average maid-servant. Luckily they are also cheap; especially when bought by the dozen or the gross. If all the lamps of the household take chimneys of the same size, the gross is possible, and a sensible economy. After buying thus in quantity, put some shavings in the bottom of a wash-boiler, pack the chimneys snugly down in it, strew a handful of salt over them, then almost fill the boiler with cold water, and set it where it will come very slowly to a boil. Let it simmer for two hours, then take from the fire and cover so thickly it will be at least three hours in cooling. When it is cold, wash the chimneys in clear hot water with a suspicion of soda in it; rinse, also in hot water, wipe dry, and store on the highest shelf in the closet. There the warmest air in the kitchen will still further toughen them. Nine chimneys in ten break through unequal heating. Boiling this way, and keeping in a warm place afterward, seems to effect some molecular change which makes the glass much less liable to break.

Boil all the movable metal parts of lamp-burners once a month for ten minutes in strong soda-water, rinse well with boiling water, and either dry in the sun or on top of a hot stove. If the burners are clogged and gummy, scour them lightly before putting on to boil. A clean burner is nearly as essential to good light as a clean chimney. Wash the chimney also in hot soda-water, rinse well, wipe dry, and polish with crumpled newspaper.

For lamp-filling one needs a small glass funnel and a length of glass pipe open at both ends. Set the funnel in the lamp-mouth, and pour in oil steadily until it comes in view at the bottom of the funnel. If by chance it stands so high the wick would make it overflow, plunge the glass tube down inside the funnel, clap a finger over the open end, and draw it back. The surplus oil will

come with it, and may be held there by keeping the finger in place until the funnel is shifted. Lamps burn better for being full, but should not be too full; invariably then the oil oozes all over the top, and either runs down on the foot or vaporises, and makes the whole room smell.

Candles

More and more fastidious home-makers are coming back to candle-light. No other light compares with it for delicious softness or artistic effect. In country houses particularly, no other light is so desirable, nor so easily managed. Candles of good sorts are cheap, and likely to be cheaper. The same is true of candlesticks, but none of the thousand new sticks are to be named beside the tall old brass and silver ones too often stowed away in garrets or kicking about cellars. Happy the house-mistress who can lay her hands upon even a pair of them. If by any chance she has a dozen, then is she blessed indeed.

It is an insult to womanly intelligence to do more than name candle-shades. The woman who does not love them, and delight in designing and contriving them to suit her separate household occasions, is indeed fit for treasons, stratagems, and spoils.

Water-Gas

There are at the least twenty different patent contrivances for using water-gas to illuminate homes. The name water-gas is due to the fact that the gas is generated by allowing water to trickle down upon calcium carbide. In quantity the gas is so explosive, no municipality permits its storage in quantity within municipal bounds. But where it can be consumed almost as fast as it is generated, there is no danger whatever. It burns

with a brilliant steady white flame, and ranks next to electric light as an illuminant, though it gives too little heat for cooking. It has the drawback of smelling to heaven, a peculiar, pungently acrid smell, like nothing else smellable. This is in a way a safeguard, as the smell gives warning of over-production, or if the gas-generation goes on after burning ceases. While all the individual gas-plants differ in detail, they have a few common essential principles. One is the storage of the dry carbide—which is quicklime fused with carbon in an electric furnace—in separate cylinders, in charges, each calculated to supply so many feet of gas. The number of charged cylinders varies. Water is admitted to them one after another so as to keep up a continuous flow. The gas is led over into a general receiver, whence its own buoyancy takes it through the system of house-pipes. Theoretically the individual gas-plant is a boon. How it will turn out in practical demonstration is one of the things that remain to be seen. But certainly it should have the abiding merit of cheapness, since it is easily possible to supply water-gas at ten cents the thousand feet, and still make a handsome profit on the transaction.

As to Heaters and Heating

Since a good three parts of the world lives in hired houses, the manner of heating them is a fixed fact, to be accepted and made the best of. But in choosing a hired house, with two otherwise equally desirable, take that which has steam or hot-water heating in preference to a furnace. Similarly, choose open grates rather than stoves. Stoves can be so managed as to heat without harm, but in careless hands are deadly. The grate-fire, besides being the very best ventilator, is an excellent good comrade, withal no end decorative. Any uncluttered room indeed, with an easy-chair, an open fire, and a weli-

swept hearth, is bound to be home-like and inviting, no matter how meagre its other plenishings.

A register cannot but be uncompromisingly ugly, withal somewhat depressing; still, a furnace unquestionably saves so much in work and fuel, its day is likely to be long in the land. There are several hundred patterns of furnace, but all have the same essentials, to wit—fire-pot, chimney-pipe, chimney-pipe damper, dust-damper, check, draughts, water-pan, cold-air pipe, and hot-air pipes. No two patterns of furnace have these essentials placed exactly alike; hence the most that can be done is to indicate generally the uses, and the way to make most useful, the several parts.

First, as to the fire-pot. If it is deep and narrow, it will hold heat tremendously, but give out a small supply proportionately to coal consumption. Such a shape is to be recommended where a low steady heat is required, without too much looking after. Contrariwise, a broad shallow fire-pot will make a house warm very quickly, but needs constant attention if it is to keep it so.

Flues and pipes need a yearly cleaning—in spring, if possible—just as they go out of commission. The cleaning out not only saves them from rust and corrosion, but discovers cracks and flaws at the season when repairs are cheapest and least inconvenient. It is well to give the pipes a further looking over when the time comes to build a fire. If there is the least thing wrong, have it instantly remedied, before even so much as a bit of kindling goes in the pot.

The cold-air pipe is a crucial point. There may well be two such pipes—one coming from each side of the house. Then, when the wind blows east or west, that particular pipe can be closed without inconvenience. The cold-air pipe's special function is to furnish pure air for the furnace's warming, and thus to save the house proper as much as possible from invasion by cellar air. Some

cellar air will go through the hot-air pipes in spite of everything; hence the vital necessity, in furnace-heated houses, of keeping cellars in the most sanitary condition. The mouth of the cold-air pipe must be outdoors, and well away from drain or sewer openings or the neighbourhood of cesspools, and high enough not to draw in damp earthy air. Since it is a pretty big pipe, more properly a box, the mouths need to be double-covered—first, with fine wire-netting to strain out dust, and over that coarser netting, to keep the first from breaking through. Both covers need to be removable in order that, at pipe-cleaning time, the cold-air pipe may be well brushed out with a long-handled brush.

The water-pan also had better be movable, so it can be kept scrupulously clean, since its use is to provide the hot air with enough watery vapour to keep it soft. A pan allowed to grow foul with sediment will taint the hot air irretrievably.

Steam heat requires the services of a competent engineer. Hot-water heating, though adaptable to private use, likewise needs trained attention for the best success. Stoves ought to be very carefully set, both in order to lessen the risk of fire and to keep down the danger of coal-gas. Wood stoves for heating are obsolete in most parts of the country. In hunting-lodges or sea-shore cottages, where fuel fit for them is easily come by, they are useful, but nothing like so beautiful as an open fire.

Gas heat has many drawbacks. If there is draught enough to make it sanitary, the cost is almost prohibitive. The ordinary gas-log or gas-grate throws out into the room along with its heat many acrid productions poisonously irritant to throat, lungs, eyes, and mucous membrane generally. Still, a gas-log in a properly ventilated fireplace is an excellent and not over-costly decoration to a room otherwise insufficiently heated if the log is lit only about six hours in the twenty-four. Gas

heat is especially undesirable in a bedroom. An oil-heater is much better—safer, and more sanitary. Indeed, oil-burning has been so perfected of late, the small oil-heater is the very best thing to use where continuous heating is not required.

Fuel—Choice and Care of It

Wood is out of reach of all but the very rich and the very poor. In cities the use of it lies mainly betwixt the millionaires and the ragamuffins, who gather to themselves the flotsam of buildings old and new. Still, many who heat their houses with coal cook their dinners with wood. Hence it may be worth while to say that stove-wood needs to be cut at least three inches shorter than the fire-box it is to fill; that small green sticks half-seasoned make a much hotter fire than those fully seasoned; also that hard wood cooks much better than soft wood, but that the ideal fire is begun with soft wood and continued with hard. Rotten or half-rotted wood is always unsatisfactory fuel, unless one wishes simply to keep a smouldering seed of fire. For that a bit of stump, especially one from deep in the ground, is the best thing in the world.

In buying wood for an open fire, choose oak, hickory, or elm, or beech, in round sticks or split three to four inches through. Every cord will contain more or less littery small stuff. Burn a little of the small stuff whenever a fire is lighted, and mix the sorts of wood; thus the burning is longer and more picturesque. Wood keeps better under a shed than in a cellar. If the cellar is inevitable, store the wood where it is coolest, and now and again sprinkle the sticks. They should not be soaked, but kept sufficiently moist to burn steadily. Wood bone-dry, as when kept in a furnace-cellar, flashes up and out all in a whiff. Kindling wood, however, can-

not well be kept too dry. It should be split rather coarse and of different lengths. Thus it will almost pile itself into the best possible kindling shape. In storing kindling wood, separate the splinters and very small sticks, so half-a-dozen may be laid next the paper at lighting a fire.

Coal is of two sorts—anthracite and bituminous. Anthracite is very black, hard, and shiny, with but little dust. Bituminous coal also black, is less shining, has a clumsier fracture, and a sort of greasy look. Anthracite burns with very little flame, and that blue rather than red. Bituminous, or soft coal, burns with much more flame—red, yellow, bluish, and white. It is also much smokier, and makes more dust and ashes. That is why in cities the use of soft coal is so largely forbidden, unless the users take pains to burn the smoke as well as the coal.

Anthracite is the best coal, bituminous the cheapest. The goodness or badness of either is largely determined by its freedom from slaty admixture. The slate veins are also black, but are readily detected. So it rarely pays to buy coal " sight unseen " unless one knows the dealer, and is satisfied that he will play no tricks. Anthracite is divided into red ash and white ash. The red ash is best, in that it burns up more completely. It is commonly about a dollar in the ton higher than white ash. At the mines or, rather, the breakers, coal is graded as to size. Standard sizes are pea, nut, egg, range, grate, and furnace. The size bought must be largely determined by the sort of grate or fire-pot for the burning. Obviously it would be a great waste to buy coal so small it would stream out between the grate-bars or the bottom of a fire-box, and almost as much so to buy it so big one lump could not lie close enough to another to admit of proper burning.

Wherever it is possible, the coal-house or coal-bin should have a tight floor slanting a little toward the door. Let the floor-planks opposite the door run through it

and three feet beyond, depressing the outer end to match the floor-slant. A coal-hod placed mouth down upon these sloping planks can be quickly and easily filled by raking in the coal with a light steel hoe. Further, with the sloping floor it requires very little strength to keep the coal always down at the door and ready for use.

For the very small sizes a tight bin, with a low spout something like a pump spout, closed by a sliding panel, saves much work. The spout must be just high enough for a scuttle to go underneath. Coal of such sizes must be kept strictly apart from the grate-supply or the big lumps for the furnace.

Except upon pain of freezing, permit nobody to bring coal until the household is ready for it. Do what one may, getting in coal is a dirty job. It ought, therefore, to be only a yearly one. August is a good time to put in the year's coal, and September better still. Have the storage place, whether house, shed, or bin, thoroughly cleaned out and whitewashed. If the supply comes through a sidewalk tunnel, cover steps, windows, and walls nearest the hole with old carpet, or heavy paper well weighted. Then, as the coal is dumped, let somebody sprinkle it well with a fine-rosed watering-pot or spray nozzle. Wet the pile down again as the putting away goes on. Open cellar doors and windows, or ventilators, but be sure the registers are tightly closed; also all doors from the cellar to the house above. After the coal is in, sweep the cellar twice, first with a wet broom, then a dry one. Lift carpets or paper very carefully, and shake the coal-dust from them into a scuttle rather than in the street.

If coal must be carried across a lawn or bit of garden, lay down planks for the carriers to tread or run their barrows on. Tramped grass, with coal ground into it, is seldom healthy afterward. Keep the plank from year to year, and have all ready for the transit before a lump

of coal falls. Here, as in the other case, sprinkling is useful—as anything is useful which helps to cleanliness by prevention.

Making Fires

To light a furnace-fire, see first that the pipe-system is in order, and the fire-pot and ash-pan free of ashes. Close all registers, next fill the water-pan. Half-fill the fire-pot with kindlings, the very lightest at the bottom, upon a little greasy paper. Open the draughts; that is, the holes in the bottom of the furnace-doors. Set fire to a wisp of paper, and thrust it in the chimney-pipe to start the up-draught, then set fire to the kindling, let it burn for five minutes; then put on some heavier sticks, and, when they are well caught, a thin layer of coal. As soon as this layer is well afire, fill up with coal almost to the top of the fire-pot.

Now open registers, fresh-air pipe, and the damper. When the deep coal is well afire, close the draughts. By and by, when the house is well warmed, open the check-damper slightly to still further slack the fire.

In moderate weather a well-built furnace-fire will last for twenty-four hours. In severe weather it ought to have fresh coal at night, and in arctic spells be kept so freely burning it will need a fresh hodful in the middle of the day. Combustion is regulated by draughts, checks, and dampers, the use of all which may be readily learned from the man who cleans out and looks after the pipes. One most essential thing in building up the fire is to close the draughts tight, and open the damper, leaving them thus for fifteen minutes after putting on the coal. This is to drive the coal-gas up the chimney-pipe. It escapes when heat first strikes through the coal, and is so heavy that, unless thus sent up in a forced draught, it will ooze and creep up through the registers, poisoning the house. Brighten the fire a little in the morning, and

put on a thin layer of coal before raking or shaking it. When that layer is well afire, do the shaking, and refill the fire-pot.

All that has been said of building a furnace-fire applies to stove-fires, especially the part about keeping draughts closed and damper open after putting on fresh fuel. A grate-fire is managed by help of a damper in the chimney throat and a blower. Kindle with crumpled paper and wood, then put on a little coal, and set it going with the blower. As soon as the blower gets very hot, fill up the grate, put on the blower again, let it stay till the coal is red half-way up, then take it down and close the chimney-damper.

To make a noiseless fire, as in a sick-room or a parlour, put the coal in paper-bags, and lay it bag at a time in the grate. Do not put on a fresh bag until the paper of the first has burned through. Thus a fire can be kept up not only noiselessly, but without dust or dirt. To take away the ashes from such a fire, sprinkle the ash-pan well before touching it, take it out, set it gently across a long doubled wire, catch the wire up each side, and carry outside the room. Brush up what ashes may remain with a feather brush, and wipe the whole space quickly with a damp cloth.

A range-fire—any coal fire, indeed—is built upon the same general lines as that in the furnace. But it is worth while to say that in a range-fire, baking depends on understanding the use of the damper. A damper, be it understood, is a flat movable iron-plate that when open lies almost flat against some part of range or furnace, and when closed very nearly shuts some aperture. In a range, what is known as the smoke-damper is most commonly right at the foot of the chimney-pipe. When it is open, smoke and hot air go curling up the chimney, passing only over the top of the oven. When it is closed, the smoke struggles, somehow, upward, but most of the

hot air is drawn under and around the whole oven-body to find exit at a lower opening into the chimney-pipe. It is in this passing around that the hot air carries with it the fine ashes which cover the tops of range ovens. They should be removed from the oven-top at least monthly. Fortnightly is better. Minute directions for range fires would be a waste of space. No two makes of range, hardly any two ranges, burn the same. Besides, a person of average intelligence will not make three fires without learning more than could be taught in a whole book.

Clinkers

Clinkers are the penalty of carelessness. If a stove is properly managed, and never allowed to get white hot, there will be no clinkers, which are aggregations of mineral matter fused from the coal, but unconsumed, and adherent to the grate-bars. The remedy for them is quicklime, either in its proper form, or as oyster or clam shells. Put the shells—which are preferable—over the face of a very hot fire, and let them burn up. The clinkers should come away in the ashes. If quicklime is used, be sure the lumps are well burned and not too big. They have a tendency to put out the fire instead of making it hotter, as is the case with shells. In taking up ashes after such a burning, strike the clinkers still adherent smartly with the poker. Unless they come away without difficulty, burn more shells or lime next day.

Softening Heat

A stove should have a vessel of water, an earthen vessel if possible, set on top of it whenever it holds fire. Empty the vessel daily, and wash it clean. With steam heat or hot-water heat, set earthen bowls full of water on top of each radiator. Furnace heat can be softened

either with the cheese-cloth screens (See Chapter on Sick-Rooms) or by hanging a big wet sponge in front of the register, whenever the fire is fiercest. Another way of softening furnace heat is to open wider the fresh-air pipe, thus giving more air than the furnace can dry out. This also reduces the heat, an end more cheaply attained by slacking or banking the fire.

Chapter *FIFTEEN*

Disease Prevention—First Aid—Home Care of the Sick

IN the defense against disease two things are necessary —a systematic union of fighters, the sanitary organization; and personal preparedness, the product of intelligent and diligent personal hygiene.

There is a growing appreciation of the importance of public sanitation, of maintaining the efficiency of the standing army of health.

Wonderful victories in combating infectious maladies have somewhat diverted popular attention from the equally important personal fortification against disease of all kinds. Many think of hygiene more as a remedy than as a preventive.

There is a large available mass of literature on health subjects—work, exercise, relaxation, sleep, fresh air, proper temperatures, food, cooking, cleanliness, etc.—that should be judiciously selected and studied. No one is safe from the dangers of disease who is not habitually watchful for the many pitfalls that beset his path. Particularizing in this respect would be an endless warning. Every person must learn for himself what peril threatens in his special

place in life. With some it is sloth, gluttony, or other sins bearing equally ugly names; with others it is overweening ambitions, hurtful emotionalism, misdirected mental struggles.

There is at hand, in the exercise of hygiene, a means, not of prolonging life indefinitely or even of curing all grave diseases, but of getting the full quota of enjoyable living. Many who grasp at every vaunted cure-all or fashionable recipe for their petty or shameful ills, grossly neglect such simple, health-giving things as exercise, fresh air, and proper house temperature. Any excuse is sufficient to keep them the livelong day in an office chair or rocker like a shiftless soldier mounting the hobby that amuses him or malingering to avoid drill. The eight-hour work day does not help with the slothful. Short hours of labor are for them a hygienic as well as an economic waste, for loafing is often worse for health than hard labor. That they do too much useful work to make exercise for exercise's sake necessary is the excuse of many. It must not be forgotten that useful indoor work is often productive of damage to the body or mind. Professional deformities and mental strain are frequent results calling most imperatively for carefully regulated compensating open-air exercise. Most men, perhaps athletic in youth, grow stale and deteriorate in physical tone after 30 and few grown women take sufficient active outdoor exercise.

First Aid

Most illnesses and accidents can and should be avoided. But—human nature being what it is—it is the part of wisdom to be prepared for them and to know what do to when trouble comes.

Send for the doctor straight away in case of either serious illness or accident. But there are various simple things that may be done while waiting for him. As for example,

in case of a fainting person, to loosen clothes, particularly where they bind the neck, to lay the head low—a little lower than the body, if possible—to dash cold water in the face, hold ammonia under the nostrils, rub wrists and temples with alcohol, camphor, or cologne water, or, if the faint is severe and prolonged, to put mustard upon the back of the neck. Give all the air possible, and permit no crowding. Even with an insensible person such crowding somehow robs the air of vitality. Insensibility from a fall predicates concussion. Offset it by vigorous friction of hands, feet, and along the spine. Stimulate at the earliest possible minute. Handle with the greatest caution, especially if there is a chance of an injured spine. Keep the patient reclining, but with the head something higher than the feet, the whole body in a gentle slope.

For Cuts or Wounds

Where blood comes in jets from even a small wound, there is no time to lose. The jetting is from a severed artery. Tie two handkerchiefs together, drawing the knots very hard. Slip them about the wounded part between the wound and the trunk. Look for the course of the artery; set a knot well over it, thrust in a short stick, and twist it round and round until the knot indents itself deeply in the flesh. Keep the knot there until the surgeon comes. Five minutes in such a case may mean life or death. Cut veins, though not so dangerous as severed arteries, are sufficiently so to need almost equally prompt treatment. Where blood flows in steady streams of dark crimson, put the knot below the wound, and twist it as before directed. Veins gather up blood from the extremities. Arteries take their supply straight from the heart.

Shock

In shock always send for a doctor when you can. Before he comes, warm and stimulate the patient in every possible way. Place him on his back with his head low and cover him with your coat or a blanket. Rub his arms and legs toward his body but do not uncover him to do this. If you have ammonia or smelling salts, place them before the patient's nose so he may breathe them.

This is all you can do when unconsciousness is complete. When the patient begins to recover a little, however, and as soon as he can swallow, give him hot tea or coffee, or a half teaspoonful of aromatic spirits of ammonia in a quarter glass of water.

Bruises

Everybody has suffered from a bruise at some time in his life and knows just what it is. A slight bruise needs no treatment. For a severe one, apply very hot or very cold water to prevent pain and swelling.

Sprains

A person slips and twists his ankle and immediately suffers severe pain, and in a little while the ankle begins to swell. The sprained joint should be put in an elevated position and cloths wrung out in very hot or very cold water should be wrapped around it and changed very frequently. Movement of any sprained joint is likely to increase the injury, so this ought not to be permitted. Walking with a sprained ankle is not only exceedingly painful, but it generally increases the hurt.

Sunstroke and Heat Exhaustion

Sunstroke and heat exhaustion, though due to the same cause, are quite different and require different treatment.

In sunstroke unconsciousness is complete. The face is red, pupils large, the skin is very hot and dry with no perspiration. The patient sighs and the pulse is full and slow. The treatment for sunstroke consists in reducing the temperature of the body. A doctor should be summoned whenever possible. The patient should be removed to a cool place and his clothing loosened, or better the greater part of it removed. Cold water, or ice, should be rubbed over the face neck, chest, and in armpits. When consciousness returns give cold water freely.

Heat exhaustion is simply exhaustion or collapse due to heat. The patient is greatly depressed and weak but not usually unconscious. Face is pale and covered with clammy sweat, breathing and pulse are weak and rapid. While this condition is not nearly as dangerous as sunstroke, a doctor should be summoned if possible. Remove the patient to a cool place and have him lie down with his clothing loosened. Don't use anything cold externally, but permit him to take small sips of cold water. Stimulants should be given just as in fainting.

Frost-bite

Remember that you are in danger of frost-bite if you do not wear sufficient clothing in cold weather, and that rubbing any part of the body which becomes very cold helps to prevent frost-bite because it brings more warm blood to the surface. The danger is when, after being cold, the part suddenly has no feeling.

The object of the treatment is gradually to restore warmth to the frozen part. To do this the part should be rubbed first with snow or cold water; the water should be warmed gradually. The use of hot water at once would be likely to cause mortification of the frozen part.

Poisoning

For all poisons send for a doctor at once and if possible have the messenger tell what poison has been taken so that the doctor may bring the proper antidote. Do not wait for him to arrive, but give an emetic to rid the stomach of the poison. Good emetics are mustard and water, salt water, or lukewarm water alone in large quantities. Never mind the exact dose, and if vomiting is not profuse repeat the dose.

Burns and Scalds

For slight burns in order to relieve the pain some dressing to exclude the air is needed. Very good substances of this character are pastes made with water and baking soda, starch, or flour. Carbolized vaseline, olive or castor oil, and fresh lard or cream are all good. One of these substances should be smeared over a thin piece of cloth and placed on the burned part. A bandage should be put over this to hold the dressing in place and for additional protection.

Severe burns and scalds are very serious injuries which require treatment from a physician. Pending his arrival the nurse should remember to treat the sufferer for shock as well as to dress the wound.

Burns from electricity should be treated exactly like other burns.

Do not attempt to remove clothing which sticks to a burn; cut the cloth around the part which sticks and leave it on the burn.

Something in the Eye

No little thing causes more pain and discomfort than something in the eye. Do not rub to remove a foreign body from the eye, as this is likely to injure the delicate covering of the eyeball. First, close the eye so the tears will accumulate, these may wash the foreign body into plain

view so that it may be easily removed. If this fails, pull the upper lid over the lower two or three times, close the nostril on the opposite side and have the patient blow his nose hard. If the foreign body still remains in the eye, examine first under the lower and then the upper lid. For the former have the patient look up, press lower lid down, and if the foreign body is seen lift it out gently with the corner of a clean handkerchief. It is not so easy to see the upper lid. Seat the patient in a chair with his head bent backward. Stand behind him and place a match or thin pencil across the upper lid one half an inch from its edge, turn the upper lid back over the match, and lift the foreign body off as before. A drop of castor oil in the eye after removing the foreign body will soothe it.

Sunburn

This is simply an inflammation of the skin due to action of the sun. It may be prevented by hardening the skin gradually. Any toilet powder or boracic acid will protect the skin to a considerable extent. The treatment consists of soothing applications such as ordinary or carbolized vaseline.

Nose-Bleed

Usually this does not result from a wound, but comes on spontaneously. Slight nose-bleed does not require treatment, as no harm will result from it.

Treatment for Severe Cases.—Place patient in a chair with his head hanging backward. Loosen collar and anything tight around the neck. Apply cold to the back of the neck by means of a key or a cloth wrung out in cold water.

Put a roll of paper under the upper lip between it and the gum. If bleeding does not cease, a teaspoonful of salt or vinegar to a cupful of water, should be snuffed up the nose.

If bleeding still continues, send for a doctor to come at

once. Before his arrival place a small piece of cotton or gauze in the nostril from which the blood comes and shove it in gently for about one inch. A pencil answers very well to push this plug in.

Pinching the soft part of the nose below the bone will also help to stop bleeding.

Stimulants should be used only upon the order of a physician.

Diarrhea

The object of treatment is to expel the indigestible matter from the bowels. This is best accomplished by giving 1/10-grain doses of calomel, 15 minutes apart until 6 doses are taken, and by following this after 8 or 10 hours by a Seidlitz powder or a dose of Epsom Salts.

For diarrhea with considerable cramping pain a teaspoonful of syrup of ginger in ⅓ of a glass of water should be given after each passage. For painless diarrhea, 20 grains of subnitrate of bismuth, 3 times daily, is a good and safe remedy. For children a dose of castor oil should be given instead of the remedies which have been mentioned.

The diet is also of great importance in diarrhea and nothing should be eaten which will furnish new food for fermentation or will irritate the digestive organs.

Milk in small quantities in the best food for both grown-ups and children. Boiling the milk is the wiser plan unless it is certain that it is very fresh and pure.

Constipation

Constipation may be prevented in most people. Persons inclined to be constipated should be careful to eat bulky food; oatmeal and the like are especially good as they irritate the intestines slightly. They should also drink plenty of water. Many persons, too, suffer from chronic constipation because they are careless and do not establish

regular habits. Instead of always taking cathartics, one who suffers from chronic constipation should try to get rid of the cause of this condition. To do this the advice of a doctor is required.

For acute constipation, six 1/10-grain doses of calomel at intervals of 15 minutes, taken at night, and a Seidlitz Powder or a dose of Epsom Salts the next morning are excellent remedies.

Earache

This is likely to result seriously and a doctor should be consulted in order to prevent bad results with possible loss of hearing. Hot cloths, a bag of heated salt, or a hot bottle applied to the ear will often cure earache. A few drops of alcohol on a hot cloth so placed that the alcohol fumes enter the ear will often succeed. If neither is effective heat a few drops of sweet oil as hot as you can stand, put a few drops in the ear and plug with cotton. Be careful that it is not too hot.

Toothache

Remember that toothache indicates something seriously wrong with the teeth which can only be permanently corrected by a dentist. In toothache if you can find a cavity, clean it out with a small piece of cotton or a toothpick. Then plug it with cotton, on which a drop of oil of cloves has been put if you have it. If no cavity is found, soak a piece of cotton in camphor and apply it to the outside of the gum. Hot cloths and hot bottles or bags will help in toothache, just as they do in earache.

Hiccough

This is due to indigestion. Holding the breath will often cure, as will also drinking a full glass of water in small sips without taking a breath. If these fail, vomiting is an almost certain remedy.

Poultices, Bandages, the Uses of Plaster

Prepare for emergencies—then they are not half so formidable. Devote old linen religiously to bandage uses. Tear it lengthwise into strips two to three inches wide, join the strips flat, laying one end on the other and running twice with soft thread into lengths of two or three yards. Pull off all ravellings, then begin at one end and roll up the bandage in a smooth softish roll. Make as many of these rolls as will half-fill a glass fruit jar. Put a light weight in the bottom of the jar, pack the bandages over it, then fill up to the top with absorbent cotton, and set the jar upon an inverted plate, in a kettle of cold water, deep enough to have the water come within an inch of the bottle-neck. Put the kettle over a slow fire, and heat the water to about one hundred and eighty degrees, and keep the heat steady for three hours. Remove the kettle, let it cool somewhat, screw on the jar-top tight, and when cold take out of the water, wipe, and set away. The bandages and cotton will have been sterilized by the heat; hence in no danger of infecting a green wound.

Make bags of old linen for poultices, with loosely run draw-strings at the mouth. In use half-fill the bag with the poultice-stuff, and spread it by pressing between the palms. For poulticing a boil or abcess, first lay over the rising a bit of sterilixed linen, lightly wet with olive-oil. On top of that put the poultice. If sterilized linen is not at hand, scorch a bit beside a flame or under a hot iron. Where poultices must be applied very hot, use three of the bags, keeping two of them constantly upon a bit of board laid in a hot oven. Wrapping the bags in soft flannel keeps in the heat, and often helps a poultice to abate severe pain.

Mustard poultices wet with white of egg burn quicker than if water is used, but never blister the skin. Hot water is better than cold for wetting. Mix the dry mustard

with half its own bulk of flour, wet to a soft paste, and spread evenly, about twice as thick as paper. Cover the face of the plaster with fine old lawn or very fine cheese-cloth. Where quick blistering is desired, wet the mustard with pepper-vinegar.

Where there are many children, especially boys, it is wise to keep finger-stalls in plentiful stock. Make them to fit all sizes of finger, either of stout cotton or wash-leather, sew on narrow tapes for tying up around the wrist, and hang in rows upon the inside of the medicine-closet door. When a cut or bruised or mashed finger must be treated, wash it very clean, unless the bleeding is excessive, put a small flat pad of sterilized absorbent cotton over the hurt, then wrap a little more cotton around the finger, draw on a stall-open-ended or closed, as required; hold the hand fingers up, and deluge stall and finger with spirits of turpentine. Keep the hand up, but resting easily, for fifteen minutes. Unless there is pain, and inflammation shows beyond the stall, leave the hurt alone for two or three days. Generally in that time it will heal beautifully.

Children, especially boys, should be taught, when they wound themselves on hands or feet in outdoor play, to at once suck the wound very clean. Lock-jaw, the thing which makes cuts and bruises dangerous, comes from a bacillus that abides in dirt and grime. The toy-pistol mortality after the Fourth of July is due to the fact that the small boys who get hurt by their pistols have commonly very dirty hands. A dry wound—that is, one that bleeds very little—is much more dangerous than one which bleeds freely. Sucking such a wound is the best means of instant cleansing. Before dressing such a wound, wash it very well with surgeons' soap and tepid water, and paint with a camel's-hair brush dipped in very weak carbolic acid.

For a gaping, bleeding cut, take a strip of court-plaster, two inches wide and rather longer than the cut. Fold it down the middle, and cut across the fold at eighth-inch

distances, but do not let the cuts reach the edge. Leave at least a quarter-inch there. Then cut half the strips loose at one edge, the other half at the other. The result will be two toothed strips of the plaster. Moisten them, and apply one each side of the wound. Hold the edges of it together while the strips dry a bit, then moisten the teeth of each strip, and stick them down across the cut so as to hold its edges touching. This saves stitches, which are very painful, and apt to leave ugly white scars.

Home Care of the Sick

Since the trained nurse is a luxury of woe beyond reach of so many of us, it is worth while to set down some things, possible to any person of ordinary intelligence, which, faithfully followed, will make her absence much less keenly felt.

The Bed

The ideal sick-room is very clean, somewhat bare, reasonably spacious, airy as all outdoors, well lighted but capable of being noiselessly darkened, windowed upon at least two sides, with an open fireplace, and doors so hung and fitted they do not slam, creak, nor bind.

Where choice is possible, take the room most nearly approaching these conditions. Remove all draperies and superfluous furniture, take up the carpet or cover it with a sheet of unbleached coarse muslin, tacked down smooth and tight, and glue felt-pads upon the legs of all sorts of small movables, as chairs, tables, and so on. A brass or iron bedstead, three-quarter size, is best. Single beds are handy in confined spaces, but do not admit of the easy postures possible on wider couches. Whatever the size or material of the bedstead, see that it is stout and tight, so there shall be no creakings or givings away, to torment over-wrought nerves or fevered brains.

A firm woven-wire spring, with a light curled-hair mattress above it, is the best bed. Thick heavy mattresses are ill to turn and shift. Put either a thick comfort, or pad of cotton tacked between cheese-cloth, on top of the mattress, and change it for a freshly aired one every other day. Spread a clean sheet big enough to tuck in all round over the pad, and fasten it at the corners underneath the mattress with safety-pins, securely clasped. Tuck in the upper sheet at the bottom, but not along the sides, and be sure to lay a fold three inches wide in the sheet and the blankets, just above the foot. This keeps the bed-covers from binding the feet disagreeably, and producing cramps in them. The sheet should be long enough to fold back six inches over the top of the blankets, which should be so spread as to rest half-way up the bolster.

A soft bolster and three pillows of varying hardness complete the bed-furnishings. Nothing so rests a tired or fevered head as a fresh, cool pillow in a clean slip, of proportions unlike that on which it has been lying. Further, raising the head or lowering it often helps to induce sleep. In at least seven cases out of ten, sleep is nature's best medicine, and medicine's best ally. If a counterpane is used, let it be very light, and smooth to the touch. Illness accentuates every sense; rough or furry or honeycomb surfaces may be horribly irritating to racked or fevered nerves.

Set the bed well away from the wall, even at the head. No matter how quiet the house-seat, there will inevitably be jars and vibrations running through it, to communicate themselves to whatever touches a wall. Where the room is big enough, it is a good plan to put the bed quite in the middle of the floor, unless such placing brings the light over the patient's head or full in his eyes.

Other Furnishings

With the bed placed, set a small table, light but firm on its legs, a little way behind the bed-head. Cover it with a folded towel, changed daily, so nothing set upon it shall make a clatter. Keep on it a pad and pencil for marking hours to give medicine and nourishment, to record the patient's temperature, and such other notes of his condition as shall seem advisable. Beside the pad keep the clinical thermometer, soused in a glass of borax water. Wash the thermometer clean before putting it in the patient's mouth, and wash again before it goes back into the borax water. Change the water every day, and scald out the glass at each changing.

If hot water is ordered for any purpose, do not use that which comes from the faucets. Boil it fresh, and, if possible, after filtering. The boiling is best done outside. But in summer, or where the kitchen is a great way off, a small alcohol-stove is a very present help. Oil-stoves should not be used inside a sick-room. No matter how carefully they are managed, they will smell enough to distress acute sick nostrils. For the same reasons lamps are out of place, unless in summer, with an open fireplace in which they can be set, and create a purifying draught up the chimney.

With gas at hand, a gas-stove is not objectionable. One with two burners is best. In cases of lung fever, bronchitis, and kindred complaints, there is often great relief from setting a vessel of clean water over a gas-stove turned so low the water barely simmers. The vapour softens the air, and makes it less distressing to labouring lungs. There must not be enough of it to produce dampness.

With furnace heat it is well to put a screen of double cheese-cloth over the register, and keep the cloth constantly wet. Thus it not only softens the air, but strains it of dust and irritating particles, besides making it delightfully

fresh. The best screen is a box a little bigger than the register-opening, mounted upon standards, open at one end, and with the cheese-cloth tacked firmly over the other. Set the open end against the wall; the hot air pouring inside will have to pass through the cloth before escaping. Set a bowl of clean water on top of the box, and lay tapes from it to the cheese-cloth. They will serve as siphons to keep the strainer wet. Fill up the bowl at least three times a day, rinsing it well each time.

Whatever the sort of light, have a screen upon the table with it. Thus it is easy to shade the patient's eyes. If candles are used, have at least three in light flat-bottomed sticks, and provide always snuffers and extinguishers. Do not blow out a candle. Instead, clap the extinguisher over it. Thus there is no smoke nor smouldering. Beware of striking matches in a sick-room. Even to light a fire, bring in a taper set going outside.

Every sick-room ought to have at least one light folding-screen, with a scrubbable white-wood frame, and panels of gathered lawn, cheese-cloth, or silkoline. Two screens are better than one; then a bed can be fairly inclosed while a room is thoroughly aired. Make the panels of stuff so cheap they can be burned when no longer needed. Where there is an open fireplace, there is no better way of ventilating a room thoroughly in summer than to set the screens so as to inclose the fireplace; then shut doors tight and open windows six inches from the top, while an excelsior torch is burning out. That should take about five minutes; wire the excelsior loosely to a bit of lath eighteen inches long. The screens keep in the heat and force an upper draught, which brings down the foul air from close beneath the ceiling.

Besides the tables, the room needs an easy-chair and one or two light straight-backed chairs, preferably of bent wood. It should have also either a bureau, chiffonier, or closet, emptied of everything but sick-room

requisites. They should always include great plenty of towels and bed-linen, extra blankets, a clean light comfort, a rubber blanket, flannel foot-cloths, and flannel bags for hot-water bottles; and, in a drawer wholly apart, the patient's bed-gowns, along with socks or stockings and clean handkerchiefs. A warm light shawl should hang close to the head of the bed, where it may be thrown about the patient at a minute's warning.

Temperature in the Sick-Room

Keep the temperature even, anywhere between sixty and seventy degrees that the physician may order. This is much easier in winter than in summer, but may be managed even in the dog-days. To do it, take out window-sash and remove doors from their hinges. Instead of them have light frames, like screen-frames, fitted or hinged, and fill them with double cheese-cloth. Keep the cloth wet constantly; in straining through it, the air loses heat as well as dust. Very high temperatures are debilitating to most constitutions, but in exceptional cases heat proves tonic. Where there is wasting and great weakness, especially in convalescence, eighty degrees may prove as helpful to the patient as it is trying to the nurse. The great thing as regards temperature is not to let it run up and down. Alterations of even ten degrees may be fatal; particularly in lung troubles or contagious diseases.

A sick-room is better without plumbing fixtures. If it adjoins a bath-room, open the connecting door as little as possible. Keep a pitcher and basin of water on the big table, also a bowl for rinsing things immediately wanted. Do as little washing up inside the room as possible. Do no cooking at all, unless to heat milk or broth over a gas stove, bringing it in as wanted, and keeping it closely covered while it heats. The aim of everything is to prevent

noise, dust, odors, and vibration. Set down things quickly and firmly, and keep all hard or polished surfaces covered, so there can be no sound. Do not rattle spoons against cups or glasses, nor drop them with a tinkle upon the tray. There should be two trays—one square, and big enough for a plate, cup and saucer, and tiny bone dish; one round, and just large enough to carry a cup or glass. There should be clean white covers for both, and care should be taken never to spill or slop things about them. Nothing under heaven is so capricious as a sick appetite, and often nourishment means more than medicine. This is particularly true in convalescence; then a good cook and dainty nurse are worth a whole army of doctors.

A bath-tub comes in well, but is not wholly essential. A foot-tub can in no wise be done without. Both should be of tin, well japanned, and as light as possible. Have also two tin water-carriers, a porcelain slop-jar, two light commodes with close-fitting covers, a great plenty of bath-sponges, plenty of ammonia, and a soap-dish well furnished with unscented soap. In addition, in a place wholly apart from all else, keep bottles of disinfectants—chloride of lime, soda-water, bichloride of mercury, copperas-water, etc. (See Chapter on Disinfectants.) Clear lime-water is best kept in the fresh-air closet, or wherever is the place for nourishment. But there may well be two bottles of it—one for disinfection. It is the only one among the disinfectants wholly without odor. Put a cupful into a commode before it is used, and after use add a cupful of some stronger disinfectant before sending the vessel to be emptied. After emptying, it should be scalded and set to air, with half-a-cupful of chloride of lime in the bottom. All the bottles must be marked in big staring letters, with their names, and "Poison" underneath. Take care, in refilling a bottle, to keep it true to label.

Cleaning a Sick-Room

A room thus managed will never need pastilles nor any other stuffy device for disguising ill odors. It will, however, need to be cleaned at least weekly. But never put a broom on the floor of it. Go over it with a dust-mop, the ends wrung very dry out of boiling water. Wash the mop out as fast as it grows soiled. If the patient is too ill for that, wipe the floor with a damp cloth every other morning. Put a little bichloride of mercury solution in the wiping-water, say a teaspoonful to the gallon. Take off dust daily with a clean, slightly damp cloth, changing to a fresh cloth as soon as the first grows soiled. Let nothing littery or dusty go inside the room, if possible to keep it out. Have a thick, soft mat outside the door, a yard or two away, and insist that feet shall be well wiped on it before they go inside. At both sides of the bed spread down lengths of washable cotton, which can be removed, and either shaken clean or washed clean twice a a day. To clean under the bed, dampen an old bath-towel and pin it firmly over a clean, light broom; then go over the surface, holding the broom almost flat, and moving it in long, gentle strokes. This can be done in a minute, and prevents the distressing accumulation of down and dust.

Summed in a word, sick-room cleanliness, like much else of sick-room management, means prevention. The room must be scrupulously clean in the beginning. Given that advantage, reasonable care will keep it wholesome for at least six months.

Windows in the Sick-Room

Windows are all-important—light and ventilation in large measure depend on them. Take down both shades, which are noisy, and curtains, which catch dust, and rely for the due modification of light upon either awnings or

blinds. A simple awning, that can be made for twenty cents, is a length of stout drill proportioned to the window height, with a tuck run eight inches above the lower end. In this tuck a lath is slipped. The upper end is tacked to the outer edge of the window-frame. Three rings are sewn at equal distances apart up the middle, the lowest one resting upon the tuck. A cord runs through them, and into another ring screwed into the upper window-frame. This draws the awning up when not needed. When shade is required, it is let down and held out from the window by laths running from rings screwed in the window-sill, to other rings in the ends of the lath in the tuck.

To make a ventilator either at top or bottom of a window, take a half-inch board eight inches wide and an inch shorter than the space inside the window-frame. Screw small brass eyes into the ends of the board three inches from one edge. Screw corresponding hooks in the window-frame, a little way inside the sash. When air is needed, either raise or lower a sash six inches, then set a board over the opening. The eyes fitting over the hooks will hold it fast, and the inrushing air give it a slight inward slant. Thus no direct draught will be possible, though fresh air comes in plentifully.

To soften or change light, often a most refreshing thing in long illness, have a light frame the size of the window hinged to one side of the casing. Fill the frame with any light texture of restful colours, as light green, light blue, dead blue, pale gray, or pearl, or creamy pink. When the light is strongest, the screen can be swung over the window, wholly changing the aspect of the room; then, when the light is less fierce, it can be admitted unscreened. Deep green screens, with soft white drapery flung over them, are especially restful to the eyes of fever patients.

Pictures nearly always irritate sick eyes, particularly after they have been stared at through weary night-watches. Often, in cases of nervous disorder, the wall-

surface itself becomes hateful. Then, if a change of apartment is impossible, try the effect of wall-screens. They are nothing more than sheets of softly tinted stuff hung from a lath or pole to hooks screwed close under the ceiling. They must be self-coloured, with nothing staring about them. Figures on wall-screens or wall-papers, or any sort of hangings, have an atrocious trick of coming down from the wall to mop and mowe at the bed-fast. No strength of mind avails against this illusion of weakness, which has sometimes produced as real suffering as the most tormenting physical ills.

Sick-Room Management

Medicine and nourishment are matters for the physician's strict instructions. Write them down accurately, and follow to the letter. But, where latitude is given, use judgment in making variations. Do not hesitate to make them if any sudden or surprising change in the patient's condition seems to demand them. In writing down directions, do not set it, "a powder every three hours," but "powders at three, six, nine, and twelve"—of course, varying the hour, but keeping the order. Then there can be no bothersome debate as to when the last dose was swallowed. In like manner, if drops or a draught are to alternate, write: "Draught at eight, eleven, two and five." Keep to the same plan as regards nourishment, also with variable directions, as: "Cold sponge-bath if five o'clock temperature is 103."

Keep this way-bill plainly written upon the table with the temperature-chart, where a glance will show what is needed. Set beside it a small clock which does not strike. If the tinking is disturbing, either set it outside or inclose it in a glass shade, or substitute an open-faced watch for it. But accept it as a cardinal truth that nothing justifies waking a patient out of sound, refreshing sleep. Better let medi-

cine, or even nourishment, go hang than thus cruelly to disturb nature's recuperative processes.

Do whatever needs doing to the last tittle, but not one grain beyond. That is to say, ease nerves, husband strength, and thereby effectually help the patient. Always be on time, but do not spend five worrying minutes in wait for the time to come. Never begin anything until ready to go through with it. If a hot bath is ordered, or a mustard draught or blister, at a specified hour, do not set up a great pother about it half an hour beforehand. In the sick-room, more than almost anywhere else, "They also serve who only stand and wait." To wait without fuming is a Christian virtue nearly as rare as it is adorable.

Bathing and Dressing a Patient

A sponge-bath in bed is one of the very best weapons against wasting fevers. To give it with ease to nurse and patient, first spread a rubber bath-blanket out full size, and very smooth, then cover it with the softest old sheet at hand. Spread the sheet as smooth as the blanket, then begin at one edge and roll up the two, sheet inside. Continue until one-half the rubber blanket lies in a tight, small roll. Then move the patient well to one side of the bed, spread the unrolled half of the blanket, sheet side up, over the bed there, bringing the roll in the middle of the bed. Next ease the cover and lift the patient over the roll, spread it out over the other half of the bed, and pin the two upper corners in place. Begin at the patient's feet and bathe upward, working steadily and quickly, and wiping dry as the bath proceeds. When the head and face are reached, get clean water, with a little aromatic ammonia or alcohol in it. Wash and dry quickly, remove soiled clothes, which have been pushed up around the shoulders in the course of the bath, also the bath-blanket and damp sheet, tuck the blankets well about the patient's head and neck, give a

little nourishment or stimulant if permitted, and leave him for five minutes.

While he rests, take clean garments, which have been thoroughly aired and, if possible, sunned, put the sleeves of one well inside another, then spread them out in a crumply ring with the neck-bands in the middle. Gather up this crumply ring at the back of the garments, and lay them over the patient's head. Draw one arm from beneath the blankets, slip it through above his head; do the same with the other, then, lifting him slightly, pull the crumpled garments down level with the shoulders. Slip both hands under the blankets, and draw the clean clothes gradually down. Any well-conducted patient should reward such work by going straight to sleep, and waking much refreshed.

Change bed-linen in the same way the bath-blanket was used. It is better, however, to fold the half-sheet narrowly than to roll it. With a desperately sick patient, do not risk taking off the cover to put on a fresh sheet. Slip the fresh sheet underneath the soiled one, gradually, while another person gently lifts the blankets. In the case of patients violently ill, it is well to protect the mattress with a rubber blanket spread smoothly over the mattress-slip. But there must be a comfort above the blanket, both for the patient's ease and as a further protector. If soiling discharges foul the sheet and comfort, yet the patient is too ill to be lifted, slip a folded sheet very gently underneath him, then have it raised an inch by a person lifting each corner, and slip out the dirty things, replacing them with clean ones.

Where it is desirable to change a patient from one bed to another, have the bed well aired and warmed a little, even though it is summer. In cases of brain trouble, or where hemorrhage threatens, raising a patient even half-upright may mean death. If such patients needs must be moved when no stretcher is available, fold a wide comfort double, put a stout slat or pole in the fold, and lay

the patient on it, then have four people lift it, one at each corner. The pole prevents sagging, which is the main danger.

Patients of this sort had better have fresh clothes slipped on over the feet, and drawn gradually up to the shoulders. Then, by moving them very gradually upon one side after the other, the arms can be got in the sleeves. But, if motion occasions much distress, it is better to cut through the shoulder, and sew the sleeves lightly in position. Good housewives bear a conscience against cutting up good clothes, but it should never interfere with even the slightest easing of a very sick person.

A Sick-Nurse

Wear soft shoes, easy but not easy enough to scuffle about. They must be noiseless, of course. List slippers are not particularly desirable. Soft kid, with a flat heel of moderate height, is better. Have a frock of wash-stuff, sewed fast at the waist. It should be soft but not clinging, and so cut as to escape the floor by at least two inches. A white apron, changed every morning, and a white nurse's cap are always advisable. The frock should be changed every three days for one freshly washed. A suspicion of starch makes the frocks feel cleaner, but they must on no account be stiff enough to rattle. They must likewise have neither ruffles, capes, strings, nor any sort of tag-ends. Neither must they be full enough in the skirt to flap and balloon about like a mainsail when the wearer needs to move quickly.

Nothing is better than fine seersucker, or prints in small patterns and soft colours, or neat checked ginghams. Have a collar of the gown stuff, but wear a strip of white inside. Trifles, these? No doubt—if there were such things as trifles in dealing with illness and the whimsies of sick folk. A trim and dainty personality inspires confidence, and, what is very much more essential, appetite. Here is a story in point. A man who had fought through

lung fever lay hovering in the borderland between convalescence and collapse. It was very desirable that he should be nourished. His doctor, indeed, felt that there lay the *crux* of the case. With infinite trouble the sick man was persuaded to try to swallow a little broth. His nurse brought it duly, but before offering it slyly picked a speck from the edge of the cup with a finger not daintily clean. Consequently, the invalid pushed it angrily away, turned his face on his pillow, and could not be persuaded to touch food for twelve hours. When he did take it, it was too late. In three days he was dead

Always speak low but clearly in the hearing of a sick person. Never stand talking in his sight but out of earshot; he will infallibly imagine himself the subject of discourse, and draw unfavourable inferences. Many a desperate case has been pulled through in the strength of ignorance, and many more solely upon courage. Thus it behooves above everything to keep up the patient's courage. Nothing is much more depressing; however, than exaggerated cheerfulness and made-to-order mirth. The Bible to the contrary notwithstanding, it is not always a work of mercy to visit the sick. While in mild cases company may not do harm, or may even do good, nobody sick enough to raise a reasonable doubt as to the event of his illness should be permitted to receive indiscriminate visits no matter how kindly they are meant.

Right there is one of the places the nurse's absolute authority comes well in play. She is for the time being no longer a person, but an entity under the physician's strict control, responsible alone to him and her conscience as to his orders and their carrying out. She can say without offence: "So far, no further." If she is halfway fit for the place, she will of course exercise a wise and kindly discretion. Where the wearing business of night-watching stretches throughout weeks, she will know who to call on for help, and who to leave outside.

A Medicine-Closet

Keep medicines in a wall-closet so high as to be wholly out of reach by childish hands. Have double doors to it, each with a separate and secure lock, catching in a bar at the middle. All the inside ought to be cut up into pigeon-holes. In one side keep every sort of stuff that is even remotely poisonous. In the other store such standard things as calomel, borax, bicarbonate of soda, prepared chalk, Dover's powder, blue mass, quinine, caster-oil, rhubarb, Epsom, Rochelle and Carlsbad salts; alum, dry copperas, spirits turpentine, spirits camphor, alcohol, whisky, brandy, all the family of herbs and barks, lint, bandages, finger-stalls, adhesive plaster, burn salves, healing salves, dry mustard, and healing lotions. Keep everything in bottles, wide-mouthed bottles with either screw-tops or ground-glass stoppers. Wrap the medicine bottles in blue paper to exclude light, and label them outside, in addition to labelling the bottles.

Never put a half-used prescription nor any medicament of unknown composition in this closet. Throw away any compound left over; there is no telling what changes time may work in it. Upon the poison side keep opium, laudanum, morphine, cocaine, dry blue-stone, white vitriol, flowers of sulphur, Paris green, dry corrosive sublimate, dry chloride of lime, all the family of acids—oxalic, nitric, sulphuric, carbolic—ether, chloroform, tartar emetic, or any other substance capable of harm. Each substance should be in a tightly stoppered bottle, or tin or wooden box, so well closed air cannot get in or out. This half the closet must be kept always locked, and should have a single key, always in possession of the house-mistress, and seldom trusted out of her sight.

Chapter *SIXTEEN*

Bleaches, Disinfectants, and Insecticides

WHEREVER water is used in preparing insecticides, bleaches, or disinfectants, it had better be soft. The alkali in hard water affects all chemical substances more or less. This chapter does not pretend to tell exhaustively of the things comprehended in its heading, but, rather, to indicate the things most readily compounded, most easily and safely applied, and most urgently needed in the ordinary household.

Bleaches

JAVELLE WATER: A standard preparation for bleaching white things, and removing spots and stains from them. It must not touch coloured surfaces, as it is certain to fade them. To make it, dissolve half-a-pound of washing-soda in a pint of boiling water, and mix it with a quarter-pound of chloride of lime, dissolved in a quart of boiling water. Stir well together, let settle, pour off the clear liquid, and keep closely corked in a dark place, as it loses strength by standing in air and light.

LIME-WATER: This is not strictly a bleacher; indeed, it has so many uses, it is hard to classify. It is good to

soften water, to sweeten drains, to keep milk-vessels wholesome, to make milk itself set well upon squeamish or delicate stomachs, to test air for excess of carbonic acid—too much carbonic acid instantly crusts the clear lime-water over—to take out the marks of grease, which stronger alkalies have removed; in fact, for so many, many things no house ought to be without it. By beating it well into sweet-oil or linseed-oil until the mixture is creamy, there results one of the best household remedies for burns and scalds. Beyond all that, lime-water costs hardly anything but the trouble of making, which is too slight to be worth a thought. Put a lump of quick-lime as big as the two fists into a clean earthen pitcher, cover it six inches deep with cold water, stir well with a wooden spoon, and let stand six hours. Pour off the clear liquid without disturbing the lime, but let it run through double cheese-cloth. Keep in small bottles tightly corked. In use, always pour off half-an-inch from the top of a bottle newly opened, or one that has stood for a day undisturbed. Thus one gets rid of the crust—the fine iridescent pellicle formed by the lime combined with carbonic acid.

Chloride of Lime: Solutions of chloride can be bought easily and cheaply; still, there are many times and many more places where the dry chloride is safer and handier to use. Buy it in moderate quantities, a few pounds at a time, as it loses strength by standing. A solution of standard strength is thus proportioned—one pound dry chloride to one gallon boiling water. Dissolve in wood, or earthenware, or glass. Keep the solution tightly corked, partly to preserve the strength, but more to prevent oppressive smells.

Carbolic Acid: With drug-stores in easy reach, it is scarcely worth while to dissolve carbolic crystals; it is so easy to buy a solution of any desired strength. But, since all the world does not live next door to the apothe-

cary, it is here written down how to dissolve the acid for one's self. Buy the crystals of it, which are among the deadliest poisons, say half-a-pound at a time, and keep them in a thick glass bottle with a ground-glass stopper, and well wrapped from light. Set the bottle on straw in a vessel of water, let the water boil, and keep it hot until the acid dissolves. Two tablespoonfuls thus dissolved added to a gill of cold water gives a solution of standard strength—twenty-five per cent. Keep both bottles plainly labelled, as: "Carbolic Acid Crystals—Poison," and "Carbolic Acid, twenty-five per cent. Solution—Poison."

Oxalic Acid: This is good for spots and stains rather than general bleaching. It will, however, whiten time-yellowed linens with less wear than any other thing. Put a gill of the solution in two gallons of freshly boiled water, and wet the linens thoroughly in it before washing. Take care not to scratch or cut the hands, as the oxalic acid is a virulent poison. Hence never venture to keep it without a staring poison-label. Put four ounces of acid crystals and half-a-pint of cold water into a bottle they will a little more than half fill. Shake until the water is a saturated solution; that is, until it has taken up all the acid it can dissolve. A few ragged crystals will remain. After using part of the first solution, add a gill more water.

The Bleach-Barrel: Our grandmothers swore by the bleach-barrel, and well they might. Silks and ribbons and Dunstable straw bonnets were none so plenty in the good old times that they could be thrown aside for a little yellowing. Still the bleach-barrel has its uses, not perhaps identical with those of elder times, but worth considering. It is no more than a headless barrel, set on end upon the ground or the hearth. Inside it there is an iron or earthen vessel to hold a handful of live coals. Across the top are sticks for hanging things, with a thick

cloth to cover the whole contrivance. Wash whatever is to be bleached, as silk, lace, fine woollen things, or straw hats, or silk stockings, through light suds to remove the dust; rinse well, putting a little vinegar or lemon-juice in the water, wring very dry, dust thickly with powdered starch, and hang over the sticks in the barrel. Cover with the cloth, then tip up one edge, fill the inner vessel with live coals, and dash upon them two ounces of flowers of sulphur. Set the barrel edge down quickly, so as to imprison the sulphur vapour. Let it stand for two hours, then remove the cover, pull the things in shape, and hang to air. After airing, brush out the starch with a soft bristle brush. Straw hats need to have the band removed, also to be very little wet. A rim of stiff card-board inside the crown helps to keep them in shape.

Disinfectants

Carbolic Soap: Shave and melt a bar of mottled Castile soap. The melting is best done in a water-bath, so there shall be no danger of scorching. Beat into the melted soap, a little at a time, half-a-pint of carbolic acid solution of fifty per cent. strength. Keep on beating, with the soap still in the water-bath, for at least a quarter of an hour. Mould into small cakes or balls, and let stand a month in a dry place. Suds made from this soap, or scrubbing with the soap itself, will disinfect glass, pottery, and metal. With wooden vessels, burning is the thing. Carbolic soap-suds, however, will destroy germs in wood-work if applied to it boiling hot.

Bichloride of Mercury: The king of all antiseptics is bichloride of mercury—more familiarly known as corrosive sublimate. Dissolve four ounces of the salt in a gallon of boiling rain-water. Let it cool before using. For most purposes this can be diluted one-half. It is very nearly the basis of antisepsis. Surgical instru-

ments are kept covered with the solution to the very moment of using, as only thus can they remain in the state known as "surgically clean."

Bichloride is also a powerful insecticide, whose uses have been indicated in other chapters. (See Chapters on House-Cleaning, Sick-Room, Plumbing, and Sanitation.)

Sulphate Solutions: All these have special uses in disinfection, yet are prepared practically the same way. Sulphate of iron, known colloquially as copperas or green vitriol, may serve as an example. Dissolve a pound of the salt in a gallon of water at slow gentle heat. Six hours should suffice. The result is a saturated solution. Weaken it one-half for flushing drain-pipes in fair condition. A neglected water-closet which gives out foul odours should have the solution at full strength, and boiling hot. Open drains, as about stables, or from kitchens without plumbing fixtures, also need to have the copperas-water boiling hot, though it need not be more than one-third strength. Dry copperas scattered through the litter of a stable, or about poultry runs, helps to sweeten them, also to prevent infection.

Blue vitriol, or blue-stone, technically sulphate of copper, is less a disinfectant than a preventive, or, rather, germicide. Make the solution as with copperas, but dilute with four times as much water before using. Mixed in whitewash, and applied boiling hot, it banishes infection from kennels, stables, or poultry houses. Its main use is to destroy the grain smuts, all due to germ-infection of the seed. Many garden-seed grow more vigorously for wetting with the blue-stone water, and drying well before sowing.

White vitriol, sulphate of zinc, is a powerful astringent and effective germicide. Like all the other vitriols, the solution of it needs to be carefully handled. Dissolve four ounces of the salt in a half-gallon of boiling water, strain, and bottle, taking care that the bottles are very

clean. Use the solution to clean and disinfect sores, especially indolent old sores, diluting it with five times its bulk of tepid water. It is especially good on the frost-bitten feet of poultry, or frost-bitten combs, and, discreetly used, for the ailment known as "scaly leg."

All three of the vitriols are used in medicine, but the fact acquits no one from the charge of criminal carelessness if they are kept without the proper poison-label.

Cellar Disinfectants: Quick-lime, borax, charcoal, dry copperas, and plaster, are the things to make and keep a cellar sweet and fresh. Move out all things movable, sweep, take up dust, open bins and closets, and set doors and windows wide. Then in every bin or inclosed space set an earthen vessel, a dish or bowl, with several lumps of quick-lime in it. Strew grains of dry copperas all over the lime, then slack it, but do not wet it, yet be sure the slacking is thorough. Steam from the lime, rising up and out, will take away all bad air and ill odours. Leave the cellar open and empty for two hours, then scatter dry powdered borax all around, in corners and along the walls; and, wherever there is a place where it will not be in the way, hang a piece of net, such as fish-net, with some lumps of fresh charcoal tied inside. Leave the borax until next cleaning-time. Take down the charcoal bags every few weeks, empty them, heat the charcoal very hot, return to the bags and replace them. Charcoal has marvellous power to absorb all sorts of bad smells. The power is strictly proportioned to its freshness, which the heating restores. Make cheese-cloth pads of plaster, mixed with powdered slacked lime, and hang them against the walls that are likeliest to be damp. Both lime and plaster are so thirsty, they take all spare water to themselves, thereby preventing must and mould. A good way to make the pads is to stitch or run inch-tucks in a length of cheese-cloth or coarse lawn, then slip a

funnel spout into the open end of a tuck, and pour in the plaster and lime. Make the tucks an inch apart, and fill them evenly. Powdered charcoal may be mixed with the lime and plaster for pads which are to hang where food-stuffs are kept.

Insecticides

Moth-Killing: In the matter of moths, prevention is a million times better than cure. But where the pests exist, as in a rug or a carpet on the floor, there are two effectual remedies, both of which are troublesome. The first is steam, homœopathically applied. Disturb the infected spot as little as possible, but spread over it a thick clean towel wrung out of hot water. Cover with a second towel also thick, and iron at least three times with blazing-hot irons. Repeat over the whole infected surface. It may kill every live moth, but may leave eggs. Within a week repeat the process. A fortnight later go over the carpet again. The work must be very thorough, and kept carefully continuous, as, if a single hand's-breadth escapes the steaming, it is likely to prove the breeding-ground of a new moth-crop.

Where there is sufficient ventilation to prevent danger of fire or explosion, also to carry away the smell, naphtha, or even well-refined kerosene, is excellent for moths. Sweep the surface clean, then go over it with a paint-brush dipped in naphtha until it is sopping-wet. Be careful to begin work upon uneaten surface, and to put a naphtha belt all round before touching the worst spots. This is to keep the moths from running into new harbours. Keep the room closed tight for six hours, so the naphtha fumes may have a chance at flying moth-millers. Then open all doors and windows except those leading inside, and go through the room, fanning out the naphtha-gas. No light should be brought into a room so

treated for at least two days, and it is a wise precaution not to strike matches in a hall adjoining so long as a smell of naphtha is perceptible. Neither the naphtha treatment nor the steaming, if properly done, will affect the most delicate colours. Small woollens suspected of harbouring moth-eggs may be wrapped in thin clean cloths, with thick wet towels rolled outside, and popped into a very hot oven until the towels scorch slightly. This gives a steaming sufficient to destroy most of the eggs. Repeat it ten days later, especially if the woollens are to be packed away.

To Kill Roaches and Water-Bugs: Mix dry powdered borax with its own bulk of white sugar, and set it in shallow vessels all about where the crawling pests disport themselves. Renew the mixture every few days, taking care to sweep up and burn all the dead insects. Paint visible pipes, and the spaces where they enter the wall, periodically with turpentine. Let the turpentine run down and around the pipes, especially hot-water pipes, but be careful to do it when the water is cool. Now and again pour a spoonful of pure turpentine down sinks and traps. Cut Irish potatoes in half, dip the cut sides in the borax and sugar, and lay them about under sinks, tubs, and closets; indeed, in any place that offers safe harbourage. Do this toward evening. In the morning gather the potatoes, which should lie cut-side down, very quickly, and drop them into a bucket of boiling water. If insects are plenty, there will likely be from one to a dozen clinging to each piece.

Larkspur: The common garden larkspur is one of the very best insecticides; the trouble is, one can seldom buy it, and the most part of those who need it have no chance to raise it. It should be sown rather thickly, and cut when the first flower-stalks are well budded. Dry in the shade, tie in bundles, and hang where it is dry and airy. Every part of the plant, leaf, stalk, and blos-

som, has the virtue of killing vermin, more particularly the vermin which infests living things. For fleas, lice, mites, upon cats, dogs, and poultry, a washing with larkspur soap, followed by dustings with larkspur, powdered and mixed with cornstarch, works wonders. Unlike carbolic soap, the larkspur soap is not poisonous; thus an animal licking its coat after the washing is in no danger. To make the soap, first infuse a generous handful of dry larkspur stems and leaves, in barely enough water to cover, for several hours. Strain off the tea, melt some good white soap in a water-bath, and beat the tea well into it. Continue beating until the soap cools, and leave the vessel containing it in a warm place for several days. Then cut out the soap, and set the cakes to dry. They should have a faint greenish colour. For the powder, pick off leaves, make them crisp in the oven, rub fine between the hands, and sift through fine net. Mix what passes through with starch, but do not throw away the coarser residue; it serves excellently to make wash for scalding out nest-boxes, bird-cages, and so on. In using the powder, part the hair along the animal's back gently, and shake in. The nearer the back-bone and spaces back of the ears are covered, the more certain the effect.

In the poultry-house larkspur is invaluable. A strong infusion of it, mixed to a whitewash, prevents mites, the minute pests which most trouble all sorts of feathered things. Mix larkspur-stalks in the nest-straw for sitting hens, and shake the powdered leaves, mixed with flowers of sulphur, well through the feathers on the back and around the neck. Mix the same powder well through the ashes of the dusting-box.

For Mosquitoes: The mosquito is commonly a local issue, seldom prevalent more than a mile from his breeding-spot. Hence the usefulness of prevention. Mosquitoes invariably breed in stagnant water. Seek out all such spots as soon as ice melts, and cover their surfaces

with thin layers of crude kerosene. One ounce will spread over fifteen square feet of surface. Two weeks later make a second application, and, after a month, a third. By concerted action almost any suburban place or country neighbourhood may be rid of these pests.

Where prevention is impossible, close sleeping-rooms tight in the morning, and burn in each of them a teaspoonful of Persian insect-powder. Leave closed for three hours, then air well while the sun is hottest, and put back screens. Where a room must be occupied at once, and is found infested with mosquitoes, put a pinch of gunpowder upon a plate, set it in the middle of the room, and touch it off by means of a greased thread, lighted and allowed to act as a fuse. The concussion of explosion will kill most of the mosquitoes, and so stun the rest they may be easily fought away.

Poison Powders: Paris green, Scheele's green, and London purple, all of arsenical origin, are the things wherewith to conquer the myriads of garden insects. Most of these insects live by eating or sucking young leaves, vines, and stems. Such as the squash-bug, potato-beetle, grasshopper, locust, and flea-bug, quickly kill themselves if given the chance. To give them the chance, mix half-a-pound of the poison powder with half-a-pound of flour, and a pound of sifted slacked lime. Tie it in a cheese-cloth bag, and dust the plants well while dew is on them, or just after a rain. Newly set cabbage may be dusted the same as squashes, melons, and potato-vines. The poison vanishes in fifteen to twenty days; besides, if it did not, one would have to eat a whole barrel of the cabbage at one sitting in order to get enough arsenic for a dangerous dose.

Bordeaux Mixture: Dissolve a pound of blue vitriol in five gallons of water, stirring well that no lumps may be left. Mix a pound of powdered unslacked lime with water enough to bring it to the consistence of creamy

milk. Stir well, strain out any grit, and mix slowly with the blue-stone, then add four gallons more of water. This is to be sprayed or sprinkled through a very fine rose upon shrubs and trees afflicted with rust, or any sort of fungous growth. If there are insects as well, some form of arsenic powder may be added to the mixture, which must be constantly stirred while the sprinkling goes forward. Bordeaux mixture, indeed, is standard and sovereign for grape-rot, mould, mildew, and scabby rust. Apply to grape-vines as soon as the fruit sets, so as to prevent even the appearance of evil. A later application, when the berries are half-grown, should bring them to ripening sound and perfect.

Kerosene Emulsion: Put into a big jar half-a-gallon of kerosene and one quart of buttermilk. Stir hard with a wooden paddle, the harder the better. In five minutes the emulsion should begin to swell, and grow thick and buttery. If sweet milk must be used, turn it with vinegar before putting in the oil. For winter use on outdoor things, dip a sponge in the emulsion and go lightly over bark and branches. Never use the emulsion full strength upon any green and growing thing. Mix it with fifteen to twenty times its own bulk of warmish water, when it is to be used as a spray or for sprinkling. Thus used, it is sure death to plant-lice and all sorts of soft-bodied sucking things. For banishing red spiders, stir a little sulphur—an ounce to the quart—into the emulsion, then dilute with twenty parts water. Do the spraying or sprinkling as near night as possible, since it stays on longer then; besides, that is the time when predatory creeping things are most active.

Bisulphide of Lime: This is equally valuable against plant or animal lice. To make it, mix half-a-pound flowers of sulphur with half-a-pound quick-lime, cover the mixture with boiling water, and boil for at least five hours, until a dark-brownish strong-smelling liquid re-

sults. Dilute this liquid with one hundred times its bulk of warm water, and use as either a wash or a spray.

Soft Soap: For the orchard, garden, poultry-house, and stable, soft soap has many, many uses. All sorts of waste fat can be turned into it. Mutton fat, almost useless for any other purpose, makes excellent soap for washing fruit-trees. But whatever fat is used should be tried out, and kept where it will not become offensive. For soap-making, take three pounds of fat, and clarify it by boiling an hour with two gallons of water, and a bit of alum as big as the end of the thumb. Let it cool on the top of the water. Dissolve a pound of pearl-ash or concentrated lye in boiling water, stir it well, let it boil two minutes longer, then take off the fire, and add the grease gradually, stirring hard all the time. Keep stirring until the mixture is nearly cold. Then put back on the fire, and add five gallons of boiling water a gallon at a time. Let the pot boil gently for half-an-hour, stirring every few minutes. Take out a little soap at the end of the half-hour, make a lather with it; if no grease shows on top of the lather, the soap needs only another half-hour's cooking. If it is greasy, put in more lye, adding it gradually until the grease is taken up. If the soap does not thicken a little on cooling, add grease, a spoonful at a time. Cook steadily until done—an hour at least after adding the last grease or lye. Rightly proportioned at first, an hour's boiling is enough. Unaccountably some fat is much greasier than other fat, and one can of pearl-ash or lye may differ from another in strength, although manufacturers honestly strive to make the strength uniform. Let the soap cool in the boiler; hot soap will run through the tiniest crack or crevice in a barrel. To turn the soft soap into hard, stir in half-a-pint of clean salt to the gallon of hot soap, let it cool in something broad and shallow, and cut out the cakes. Soap keeps better in cakes, but, though they may be redissolved, the re-

sultant liquid is not quite so good. Use soft soap on fruit-trees and grape-vines in late fall or early winter, going over them well with a cloth or brush dipped in the soap diluted with its own bulk of boiling water. Scour out kennels, nest-boxes in poultry-houses, perches, and occasionally walls, with very strong suds, applied boiling hot. Make the same sort of soft soap-suds to scour mangers and floors in stables, especially if they have become vermin-infested. Nothing is much more efficacious against rats and mice than very strong soft soap swabbed for a foot or so inside their holes, and plentifully bedaubed around the hole-mouths.

Against Flies

House-flies are more than pests. There is a distinct menace in their buzzing and crawling. Screens do not always keep them out; neither is it always possible to use screens. Here are some fly-preventives, each warranted harmless to human-kind. Boil together two ounces of ground black pepper, four ounces of white sugar, and half-a-pint of sweet milk. Cook about a minute, then fill plates with the mixture, and set them where flies most do congregate. They will crowd to suck and die. Renew the mixture every two days. Keep everything edible closely covered while using it, so dead flies may not drop in. Sweep up the slain twice a day, and burn, or bury at least a foot deep.

Or, if there is a coffee-tree *(Gymnocladus Divisus)* within reach, get fresh boughs and twigs of it every day, and set them close to windows, above doors, and under tables; indeed, in all the house-fly's happy hunting-grounds. As the leaves wilt, the flies will go away; yet there is to human nostrils no offensive odour. The only trouble is to keep up the supply of fresh branches. After the leaves dry, the flies come straggling back. A remedy as potent,

and easier, is a sponge saturated with oil of lavender. If it is hung two or three feet above a table, flies will not trouble the table throughout a meal. Branches of rose geranium, bruised and hung up, or even pots of the growing plant, are said to have the same effect.

Flea-Fighting

The wicked flea pursues man, his dog, his cat, his pig, and, now and then, his cow and his goat. Wherefore he is a pest not to be lightly regarded. Cleanliness prevents him for the most part, but now and again into each life some fleas must fall. In addition to the remedies heretofore indicated for him—the larkspur soap, the bisulphide solution, the dry sulphur, and other things—one can depend on walnut boughs, full of fresh green leaves, or the leaves themselves, stripped off, and tied in cushiony bunches. Spread them under beds, on floors, around doors, and renew often. The pungent pennyroyal, either as oil or green plant, will also banish him to some extent. Dry borax dusted through the hair of a cat or dog will help to kill fleas; so will almost any good insect-powder. Fleas breed and harbour in dust, dirt, strawy litter—most of all, in shed hair. Old hog-beds, or the places where hogs have slept even a little while, are almost sure to swarm with fleas throughout the summer. If one needs must, as in camping, or picnicking, or in occupying a summer cottage, set foot in such places, the first thing is to rake and sweep up all that is rakable, sprinkle the pile well with flowers of sulphur, then with kerosene, and set it afire. If this is impracticable, as where the flea-harbour is under a house, get poles of pawpaw, red gum, young hickory, anything, indeed, with sweetish sap, have them peeled of bark—it will slip easily in summer—run the poles into the flea-territory, let them lie a while, then draw them carefully out, and scald with fully boil-

ing water. The fleas will cling to the poles, sucking for dear life; especially if they are thin, starveling fellows, who have never known the delights of blood-sucking.

Moles and Mosquitoes

Fight moles and mosquitoes with the same plant—the stately *Palma Christi*—the castor-oil plant. The seeds are the mole-bane. Drop them plentifully in the runs. Dig down neatly, so the mole will not suspect his burrow has been tampered with. If the castor-oil beans are smeared with sugar, they are said to be eaten more greedily. Against mosquitoes use leaves and branches of the plant. If there is water about, as a fountain, or a lakelet, plant the beans thickly around the edges. They grow five to ten feet high if given the chance, and are highly ornamental—sub-tropical as to foliage, and weird as to bloom and seeds. In addition to preventive planting, as around water, windows, and piazzas, set a borderful, somewhere out of sight, from which a daily supply of leaves and branches may be brought indoors.

Bites, Stings, Ivy Poison

All sorts of stings—whether from wasps, bees, hornets, or humble bees—should be sucked, to remove as much poison as possible; then have a slice of acid fruit, apple, tomato, or peach, or a crushed berry, or grape either ripe or green, bound lightly to the wound. If the pain is very severe, after a minute take off the fruit, wash the sting in warm water, and bathe it well in alcohol. Then wet a folded linen-rag in either alcohol or vinegar, and bind on the sting. If neither alcohol, vinegar, nor fruit of any sort is at hand, try a bruised plantain-leaf. Change the application, whatever it is, every ten minutes until the pain subsides.

Suck a bite, especially a spider-bite or snake-bite, very well, but be sure the lips and tongue have no raw places. If the bite inflames, and looks deadly angry, send for a physician, and, while waiting for him, wash the wound with carbolic acid in warm water, then bind on it a slice of fat pork or fat bacon. If the pain of a bite is agonising, do not hesitate to cut open the bitten place deep enough to make the blood come in a rush. If a hand or foot is bitten, tie a handkerchief about it between the wound and the trunk, and draw the ligature tight enough to slacken the flow of blood. Give the patient whisky, and keep aromatic ammonia to the nostrils. If there is fulness in the head, loosen the clothes at the neck, and lay a cold cloth upon the crown of the head and another on the nape of the neck. Put mustard to ankles and soles of the feet. In short, do everything possible to keep up heart action and keep down convulsive tendencies.

For ivy poisoning, sponge the poisoned parts well with alcohol. Go over the skin twice or thrice, using a clean cloth or sponge each time. In an hour repeat the sponging. It acts like a charm. Where alcohol is not at hand, daub the poisoned spots all over with vinegar made thick with gunpowder, and leave it on until dry.

Chapter *SEVENTEEN*

The Family Sewing, Plain Sewing

PLAIN sewing threatens to become a lost art; very much more's the pity. Perfect needlecraft is a liberal education to the eye, the fingers, and the sense of proportion. Moreover, there are few things a house-mother may practise to more profit, either artistically or financially.

Practically there are but four seams, though in execution they may be almost infinitely varied. First comes the over-seam. Commonly it joins selvages, or else hemmed edges with inset ribbon or lace. This is also the carpet-stitch. Carpet-sewing, of course, means a big needle and the very stoutest flax-thread, double and well waxed. Match the figures ahead of the needle, and make them fit, even though the fitting demands a slight puckering. Take shallow hold, never more than a quarter-inch, setting the needle in the farther side, and thrusting it well through before attempting to pull it out. Make regular stitches, and be careful not to draw one tight enough to crease the selvage, yet leave the next loose enough to stand slack upon top of it. That makes a zigzag wabbly seam, which causes puckers, wrinkles, and wear of the laid carpet.

For anything else than carpet, use rather a fine needle, and thread proportionate. Thus the work is much easier; the resultant seam much neater. Pin the edges

together six inches ahead; this insures against holding one fuller than the other. Take neat short stitches of even depth, and as shallow as will hold. After a seam is finished, separate the parts, and smooth the join hard upon the wrong side with the end of the thimble. The shorter and more regular the stitches, the daintier the joining. It is especially useful for infants' skirts—indeed, for all infantile belongings—for bed and table furnishings, and for very fine night-clothes and underwear.

Felled seams are first sewed with the back edge standing higher than the front one; then the standing edge is folded under, hem-fashion, and whipped down to the body of the garment. Machine-felling is possible to an expert operator, but is nothing like so desirable as hand-felling. The first sewing up may, however, be done on the machine. Trim away all rough edges and ravelled threads before beginning to fell, and, as in over-seam, use fine needles rather than coarse ones.

A simple raw seam is either stitched or run, keeping the edges even, and not holding one in to the other. Stitched seams are sometimes opened flat and kept flat with lines of herring-bone stitches. This is a good finish for the seams of boys' summer-trousers, as it strengthens the join, yet leaves it elastic. Run seams with selvages need no other finish. With raw edges it is wise to whip them sparsely from top to bottom.

For underwear and white goods generally, the bag seam is recommendable. To make it, first sew a very narrow seam to stand up on the right side, then turn the garment, fold it evenly along the first seam, and stitch a second line the eighth of an inch from the edge. This comes next to felling, and is often preferable, in that all the work can be done on the machine. Still, upon very fine textures, and particularly with sloped or rounded edges, it is best to run the first seam, taking short, very even, stitches. Excellence in any kind of running means

keeping the thread straight, so as to make a seam of even depth, and having the stitches the same length, not alternately short and long. The length should be proportioned to the fabric sewed. Take up four to eight threads of it, and skip as many. Counting would be a tedious waste of time. Count for the first stitch, and use that as a pattern.

Hems are of three sorts—rolled hems, flat linen hems, and the ornamental hem-stitched ones. A ruffle, a towel, napkin, sheet, or anything similar, ought to be torn or preferably cut by a thread. This, of course, does not apply to bias frills of silk or stuff. Fine ruffles of lawn, linen cambric, or mull, should have a thread drawn, and be cut with very sharp scissors. Over-seam the breadths as neatly as possible, then begin at one end and make a tiny roll at the upper edge, manipulating the cloth betwixt the right finger and thumb. With the very finest needle, and No. 100 thread, sew down the little roll with even, very short stitches. If the hem is to be trimmed, as with narrow edging, tatting, or beading, it makes the trimming more effective to herring-bone it to the roll instead of sewing the roll down. Fasten the thread firmly to the rolled edge of the ruffle, then pass the needle through the trimming, draw the thread after it, but leave the roll and the trimming-edge a twentieth-of-an-inch apart. Now fasten the thread in the trimming with a tight button-hole stitch. Hold the two edges evenly apart with the left thumb and forefinger, and join them with herring-bone stitches, setting the needle upon the cloth side well within the roll. To herring-bone, simply throw the thread from the needle forward, so the point comes up behind the thread drawn down.

A linen hem has the raw edge turned down first, then the hem proper, and is creased a third time even with the edge of the hem. By sewing through the two edges, as in over-seam, it is possible to take very neat stitches

without pricking the fingers in the least. If hem-stitch is undertaken, threads should be drawn not merely for cutting, but for both creases. After the hem is creased the right depth, draw three or five threads exactly even with it. Begin at one end, gather up three threads in the drawn space, let the needle-point come out over the thread which is held forward, then pass it up into the loose edge of the hem. Draw it down tight, and repeat all the way, taking care never to vary the number of threads in the knots.

Button-Holes

A button-hole is a sort of sewing shibboleth. Many seamstresses bungle them horribly. Hence the vogue of machine-worked button-holes, which are, however, at their very best inferior to good hand-work. Good twist, which will neither fray nor kink, is essential to good button-holes. So is clean cutting. A ragged, chewed edge can never be made to look well. Mark the button-hole spaces accurately with chalk—not only the distance apart, but the size. Where choice is possible, cut them to run straight with the threads, either warp or woof, or else on a true bias. Use twist that is fine rather than coarse, and a needle that carries the thread easily, so there shall be no pulling. Begin at the back, fasten the thread firmly, pass it directly along the cut edge to the other end, take a very short stitch there, and carry it back to the beginning, letting it lie along the other cut edge. Now take the button-hole firmly between the left thumb and finger, holding it so a cut edge projects say a quarter-inch. Stick the needle through this edge point inward, then take up the thread just behind the eye, and lay it lightly around the point. Draw out the needle, and tighten the stitch so the looped thread covers the cut edge. Repeat, keeping the stitches all the same depth

until the other end is reached. There, if the garment is a coat or jacket, set the stitches round in eyelet fashion. For any other garment, let them end square, turn the work, and begin afresh on the other side. Button-holes likely to have heavy wear are better if a double flax-thread is laid along the edge and around the corner, so as to be worked over. But, whatever is done, deft-handedness is the real essential. A button-hole once bungled is a button-hole forever spoiled.

A Sewing-Room

Every home needs a sewing-room, permanent, if possible, but at any rate throughout the stress of spring and fall work. Even to the woman who does her own sewing, it is a boon beyond calculation. Until it is tried, one has no idea what comfort lies in having things right at hand when needed, nor in knowing that they will stay there until all need is past.

A spacious airy place is, of course, much the best. Failing that, a small room is better than none at all. A north light is preferable; it gives the longest daylight and the least strain on the eyes. With a small room, take out all the furniture not actually required, and fill its place with sewing requisites.

They are neither many nor costly. The first is a sheet of unbleached muslin, big enough to cover the whole floor. Sew the seams firmly, hem the ends, and fasten it down with drugget-pins in each corner. Set the sewing-machine in the handiest place where a good light will fall over the operator's shoulder. See that the chair for it is the right height, also that it is light and free of obtrusive angles and knobs. A bent-wood chair is on many accounts the best. If it is too high for comfort, have the legs sawed off.

Always clean a machine thoroughly before beginning

a sewing campaign. The first thing is to deluge every working part with kerosene, and leave it several hours. Then wipe off the kerosene with a clean flannel, rubbing hard if gummed oil remains. Wet the treadle-joints again with kerosene. If the upper works still show dirt and grime, and particularly if they run hard, take them off and boil them twenty minutes with a handful of washing-soda in the water. Rinse by pouring boiling water over, under, and through them; it is best done from the spout of a tea-kettle. After rinsing set in a hot place for half-an-hour. Next put the works in place, oil plentifully with the very best machine-oil, run at top speed a minute, then wipe off superfluous oil, tighten up nuts and screws, see that the feed is unclogged, and that the presser-foot stands true; also that the needle is properly set, and the machine is ready for use.

Fasten to the wall, back of the machine or beside it, a set of hanging pockets, at least a dozen in number. Mark each plainly with the sort of thread it is meant to hold, as "Black Silk, No. A," or "White Cotton, No. 60." At bottom of the pockets hang a book of flannel leaves numbered from one to ten, and holding needles of sizes to match their numbers. Another set of marked pockets, for bindings, stay-casing, buttons, hooks and eyes, crayons, chalk, basting-cotton, and so on, should be put up on the wall where it can be reached from the low sewing-chair provided for hand-work. If the low chair has rockers, all the better; only they must not be aggressive. Each set of pockets can be backed with a square of denim. Sew small brass rings to the corners to slip over screw-hooks in the walls. Thus they can be put up without defacement. In a permanent sewing-room it is helpful to tack up on the wall the plates after which the garments of the moment are to be fashioned.

Two more bent-wood chairs, a folding cutting-table, a low dresser with big mirror and broad shallow drawers,

should also find place in the sewing-room. Set apart one drawer for linings and findings of all sorts, as crinoline, whalebone, wadding, and canvas. Keep another drawer for uncut stuffs, and a third for unfinished work. A bigger table with drawers and folding-leaves, for cutting big things like skirts, is a very present help, space permitting. In the table-drawers keep shears, small scissors, a whet-stone, several tape-measures, and at least half-a-dozen thimbles. Thimbles seem endowed with a certain malign intelligence, and lose themselves past finding if their loss stops work. If it is, through plentiful substitutes, a matter of no consequence, they discover themselves upon the least provocation. Set this big table against the wall if possible, and just above it swing a broad flat pocket sacred to patterns. Fold each pattern flat, and keep it in a separate big envelope plainly marked with sort and size. Always press a pattern smooth with a warm, not a hot, iron before using it. If a hot iron must be used, let the pattern lie a while, so it will not cling and curl troublesomely to the hands.

There should be two smoothing-irons, one heavy, one light, with either wooden or asbestos-covered handles. An oil-stove is the best thing to heat them with. Properly managed, it makes neither smell nor soot. It has the great advantage over gas that it can be set wherever it is most convenient. A wooden box a foot or so square will hold both the stove and the irons. By tacking sheet-tin over the top, which must be hinged on, it makes a good resting-place for the lighted stove.

Irons presuppose a press-board, which is an ironing-board in miniature, with rounded ends and rounded edges over which to shape the most obviously crooked seams. Cover the press-board with gray flannel, to be removed and washed once a year. In addition, have a white cover, cotton or linen, to go over the flannel when dainty colours must be pressed.

A lap-board, with a yard-measure marked on the top, is a great convenience. Set it up back of the low sewing-chair, but in easy reach. From one arm of this chair hang a small, compact pin-cushion cram-full of sharp clean pins and big-eyed basting-needles. From the other suspend a small closed box with a slit cut in the lid, and the end of a reel of basting-cotton pulled up through the slit. Basting-cotton has even more than the thimble's knack of losing itself. It is a wary seamstress, indeed, who gets around both.

Small things, as yokes, straps, gussets, and so on, have the same amiable propensity. The white sheet on the floor effectually balks it. Further, it helps the eyes by diffusing and prolonging a soft equal light. Incidentally, it saves the carpet or the floor from lint, and makes the occasional brushing up very much easier.

There are just two more absolute sewing-room requirements—a covered wicker-basket for scraps, bundles, and general odds-and-ends, and a light but commodious waste-basket. A folding clothes-horse, to hold work in hand, is desirable. So is a big separate mirror that may be turned at any angle, and a form for fitting and draping.

Even where the house-mother does the sewing, it is a great waste to skimp in findings or thread; indeed, in any small requisite. With a hired seamstress, such waste is not only cruel, but wicked. She must be paid for her time, and often loses more, piecing and contriving how to make five cents' worth answer for ten, than would half-finish a garment. This applies with double force to making over old garments. If it needs must be done, have everything unpicked, sponged, pressed, even dyed, before the dressmaker comes. It is well, further, to make up one's mind as one unmakes a frock. Waiting for the seamstress to make up both together is generally costly and seldom satisfactory.

As to Patterns

Patterns have their uses, oftener their abuses. No woman should permit herself to depend wholly upon them. Certainly never after she has owned and worn out one perfectly cut and fitted gown. Patterns are arbitrary, not to say absolute, whereas the human form is a varied and ever-varying entity. Moreover, figures can and do lie amazingly—when they are supposed to indicate pattern sizes. Patterns are cut for the average of measurements, hence are as unindividual as a composite photograph.

Given accurate measurements, a good tailor has before him a problem to be worked out mathematically. For example, with a waist measure of twenty-six inches, he understands that two-and-one-half of those inches must go into the back forms, whose combined breadth must exactly equal that of the side forms next it. With a smaller waist the back forms might be two inches, with a larger one, three, with corresponding increase in side-form breadth. A thirty-eight or forty inch waist would necessitate extra side forms. A very stout figure may take five instead of the usual three. Further, these side forms must be the same width from waist-line to arm-hole. The swell of the figure, no matter how redundant, is accommodated by the slope of the back forms and the fronts. In the fronts the darts must be so set that the breadth from the under-arm seam to the first of them is just that of a side form. Darts running up to a high bust need to be closer together than those taken low. When the bodice is fastened, the space from one dart to its fellow opposite ought to be just half-an-inch greater than the breadth of the two back forms.

With a well-fitted old frock, rip one-half the waist carefully apart, and leave the other half intact. Press the ripped parts very smooth, first putting a line of short

white stitches to mark the old seams. Fold the new stuff right sides together, and lay it smooth upon a table or cutting-board. Arrange the pieces of the old waist upon it, taking special pains to have the warp and woof threads run the same in new and old. Weight the old bits in place, then run a tracing-wheel along the lines of white stitches, bearing very hard. Next brush loose chalk along the wheel's track; it will go through and leave a line of fine white dots underneath. Take off the pattern pieces and cut out, keeping your scissors, which ought to be sharp and clean-cutting, an inch outside the line of dots. Cut the lining from the outside, but let the warp threads run around instead of up and down. In cutting from a paper pattern, instead of an old garment, it is well to try the pattern first on cheap plaid gingham, placing it so, when the pieces are joined, the plaids will run straight one with another. Indeed, with a pattern used many times over, it pays to paste the pattern on the gingham and cut it out. Unless the warp threads run perpendicular, and the woof straight around the waist, a tight bodice will pull out of shape and sit awry no matter how carefully it is boned.

Beware of skirts or skirt-patterns with a wide apron, very wide hip-gores, or many seams that bring bias edges together. Skirts so shaped, either lined or unlined, stretch and sag distressingly at the least wear. Always stay bias-skirt seams with a straight strip, or tape, or ribbon. In choosing skirt-patterns for goods with a nap, as cloth or velvet, beware of the so-called circular effect which makes the nap run up one side, down the other, and crosswise in front. A garment so cut requires either a corkscrew or a cyclone to brush it properly. The cyclone may develop in the wearer's spirit after a little experience.

Fitting, Boning, Hooks and Eyes

Tailor-finish so-called means sewing up the waist single, boning it, and applying a lining after. Or the process may be reversed. With a waist cut as directed, baste the seams by the dotted lines, sew up, press and bone, all but the shoulder-seams and those under the arms. In pressing woollen stuff, remember not to wet it; it draws enough moisture from the air, and water makes it look shiny. Baste the unsewed seams to stand upon the right side, try on, and pin up any slack until the fit is snug. Then hold the pinned lines firm, and mark them with chalk. Take off the garment, unpin it, and put lines of basting-stitches in the chalk-marks. Next trim away surplus stuff, always leaving a good seam. In basting up the shoulder-seams, stretch the upper half of each front as much as possible, and hold the back slightly full to it. No matter about puckers; they come out for pressing. By thus stretching the fronts, the ugly and troublesome wrinkles either side the collar are wholly done away with. If the lining is fitted instead of the outside, the same end is attained by taking a seam the eighth of an inch deep, and three inches long in the fronts, letting it begin just in front of the shoulder-seam, and extend toward the bust.

Notch all seams well before pressing, but take care the notches do not go too close. Lay an extra thickness of flannel over the press-board, and never have an iron hot enough to give even a smell of scorching. If in haste, lay a strip of waste cloth over the seam to shield it from an iron too hot. Great heat is, however, inimical; a quick-moving iron cannot give the shaping which pressing is intended to accomplish.

Hold stay-casing next to you, and put it on very full, leaving several inches free at both upper and lower ends. The sewed part should not come nearer than three inches

to the arm-holes. Soak whalebones until they are soft enough to sew through. Push them in from the bottom, cover two inches with the free tape, then sew through and through bone and casing, push the bone in hard, sew again two inches lower down, and again at the waist-line. This pushing in makes the bones curve in such fashion as to stretch the waist and hold it unwrinkled.

The great thing about hooks and eyes is to have them match accurately. One way of achieving that is to pin the edges together, mark them across with chalk at proper distances, and take a loose whip-stitch from one mark to another. Then pull the edges apart, and clip the stitches, leaving an end each side. Another way is to snip holes in a strip of cambric, lay it on the wrong side of each piece, and brush loose chalk over the holes. Still another, perhaps the easiest to a good needle-woman, is to sew on hooks as they appear to be needed, then slip an eye over each hook, and sew them on to match.

Applied lining should always stand a little loose, but not enough to be clumsy. The seams in them should be sewed a trifle larger than those in the outside, and all allowance made at the edges. Silk-waist linings, so long the hall-mark of fine frocks, are in a measure out of vogue, as they do not stand wear and perspiration to match the firmer linens and cottons. It is well to baste together the seam-edges of linings and outside at the shoulders. At neck and waist the two, of course, are faced together.

In making up a lined bodice, lay the gown stuff right side down upon the lap-board, put the lining over it, and join the two by a perfectly straight line of basting where the waist is to be. Push the lining faintly full toward this basting both above and below, and baste two more lines each about half-an-inch from the first. Then baste together all the way. After all the pieces are lined thus, baste up the seams, and fit as in tailor-making.

Skirts

With a new skirt-pattern, especially if it is to be made up in costly stuff, it is well to cut and fit the lining first. If there is no lining, shape the skirt in cheap lawn or paper muslin, and fit it accurately before putting scissors in the frock proper. Try on the false skirt. If it hangs loose at bottom in front, the apron is too flaring, and must be narrowed. If it bulges over the stomach upon sitting down, there is need of more fullness there, which is best gained by taking in the seams either side and enlarging the hip-darts. A skirt that binds at the foot in front is too straight. Have another person rip and snip and pinch about the trial skirt until the wearer, standing before the mirror, is satisfied with the hang of it.

Thin frocks are best made with a drop-skirt; that is to say, a lining shaped to themselves, yet loose except at the belt. Linings of all sorts are better made separate and put inside the skirt. If stiffening is needed, cut it on a true bias, and stitch it firmly to the skirt-lining. Put lining and skirt even at the top, seam on seam, baste the seam-edges together half-a-yard down, fasten the basting-ends very firmly, then shake the two skirts well together, and baste around the bottom. The lining had better be a little loose. Otherwise, it may pull and drag the outside.

A walking-skirt has commonly lapped or stitched seams. For the lap, cut the edges very smooth, lay one upon the other, lapping an inch, and baste firmly together. Stitch as close as possible to the outer edge on the right side, and again three-quarters-of-an-inch from that. Such a skirt needs only a braid binding at bottom, but may have a shaped facing sewed on, turned over exactly at the seam, basted up on the wrong side, and stitched in place with one or many rows. The stitched seam, which is worth practising, because it appears on so many things,

is first sewed up in ordinary fashion, then opened and each side stitched down anew as near the edge as possible. This is an excellent finish for children's cloaks, and woollen garments generally.

To make a neat, almost invisible front placket, baste up the whole seam, but begin stitching at the placket level. Press throughout, then rip out the basting, slip a thin strong tape under the pressed edges, sew on hooks and eyes, then face the front with silk of the same colour, and set on the other side a pinked fly of the skirt cloth to lap at least two inches and a half under it. Ripping at the placket-bottom may be made impossible by doubling a small square of silk and setting it, gusset-fashion, across the end of the seam. Plackets or pockets anywhere can be finished the same way. Unless the hooks are very small, it is best to cover the eyes with silk button-holing, or else to use silk loops in place of them.

For the Little Folk

It was a wise mother who said: "I try to give my children just enough clothes every season to wear out well." With a succession of olive plants through which garments can descend as they are outgrown, it may be worth while to spend much time and strength on them, but most commonly such spending is a waste. Plain clothes, well shaped, clean, and in full supply, are worth all the finery that ever fluttered to the torment of little hearts and the discomfort of big ones.

It is positive and unspeakable cruelty to swathe a newborn baby in things stiff with tucks and embroidery. A baby's skin all over is more delicate than that of a grown-up eye-lid. The eye-lid is the test for an infant's wardrobe; whatever hurts, or is even unpleasant to it, ought to be thrown aside. Even the softest stuffs are sold with more or less dressing in them. They should be well

shrunken in boiling water before making up, and then after making thoroughly laundered, without a trace of starch. Further, they ought to be ironed with warm, not hot, irons, as the hot ones give a sort of crackly surface. Make the first long clothes as simply as possible. No other trimming than a fine lace-edge at neck and wrists is comfortable, and none other is therefore permissible.

Almost the same may be said of short clothes. Lawns, muslins, gingham, are all the better for shrinking before making up. Flannel need not be wet, but should not go next new-born skin. Shirts coming well down around the hips can be knitted loosely on fine steel needles from the softest white wool. Do not use Saxony; it is too wiry. Even in Shetland there is a choice—to be determined by the eye-lid.

For children of larger growth the most that can be said is that the essential points are simplicity, symmetry, and freedom to develop their growing bodies. Frocks with tight belts have robbed childhood of joyous centuries. They ought to be forbidden by special enactment, as it should be further forbidden to put a mourning garment upon a little child.

Vagaries of the Machine

Sewing-machines have moods quite as unmistakable as those of their owners. Sometimes, for no reason in the world, one refuses to sew a particular stuff, no matter how it is presented, thick or thin, single, double, or in gathers. Occasionally it is a very thin stuff which is thus repudiated. The best remedy is to lay a slip of paper each side the offending seam, slip it under the presser-foot, and sew with steady force. After sewing, the paper can be pulled off.

Sometimes the feed refuses to take hold upon shrunken

white goods, though more commonly shrinking is a betterment as regards sewing. In that case, it is well to wet the seams with starch-water, and press them dry before trying to sew. It is troublesome, but less so than wrestling with a contrary machine. White stuffs with much dressing in them, loaded silks, and wiry woollens, are also apt to occasion trouble. For the white stuff, rub the seams with soap; for the silk, use a bit of wax; for the wool, a soaping, with waxing afterward. This when the fault lies unmistakably with the texture. Half the time, at least, when a machine of good make goes thus half-way on strike, it will be found that something is wrong—it wants oil in a vital spot, or the feed is clogged with lint, or a screw or nut is too tight or too loose. Make haste slowly by looking for the flaw, and at once remedying it. Time can in nowise be better expended.

Patching, Darning, and Mending

Patching, darning, and mending deserve a separate chapter; they can be no more than glanced at thus at the tag-end of so much else. All three may be brought almost to the level of high art. Indeed, it is an open question as to whether or no they constitute the real test of needle-craft. A thing worth patching at all is worth patching well; still, there is something to be said for the view of a good deacon who explained that by the parable of old wine in new bottles: "Our Lord meant to enforce the great truth that *sometimes a hole will last longer than a patch.*"

Patching by machine is wholly possible. It is, in fact, the best way of patching any big rent that can be mended flat. Cut a patch amply big, and baste it under the rent, so the threads will run with those of the thing to be mended. Stitch a row all around the patch, an inch from

the outer edge. Next turn under the raw edges neatly, and stitch them down. Now reverse the work. Cut out the rent, leaving a three-quarter-inch margin next the first row of stitching. Cut half through it at the corners, turn under the edges, and stitch them down.

To patch the trousers of a small boy or a big one at the knee, rip up the outer seam well past the hole, cut out the worn part square across the leg, set in a new piece matching thread to thread, stitch it firm, press the seams flat, then sew up the leg-seam, fasten, and press.

White stuff, when it begins to break, seldom pays for patching. But shirts worn only around the neck-band may have their lease of usefulness almost doubled by putting on new bands. They must be washed free of starch first, and the old bands carefully ripped, not cut off. White garments, snagged or burned in wash, are best patched by hand. Slip a patch under the rent, then baste both upon a piece of stiff paper or linen. Cut the torn part to smooth square or oblong edges, notch lightly at the corners, turn under, and hem down. Take from the paper, and hem down the other side, making the join as near as possible like a broadish flat fell.

To darn small holes in lawn, linen, or damask, baste the hole firmly over waxed linen; then, with a very fine needle and ravellings of the same stuff, go back and forth, letting the threads touch until the hole is covered. Take up the stitches at each end in a straight line, and barely cover the hole. Weave other threads across this first line, going under one, over one, as in the original fabric. If the work is well done after pressing, the spot will not show. The same method answers for soft unpatterned silk. But for glacé silks and brocades, though effectual, it is more apparent.

To darn cloth, no matter how jagged the tear, lay the torn edges so they will touch and baste in place over a soft thin woollen, such as cashmere or nun's veiling.

Then fasten it smoothly over waxed linen, and darn the rent in and out with very fine silk exactly matching the colour. Use also a very fine needle, take short stitches, and go across very close. There should be at the least thirty cross-threads to the inch of darn. Fifty is better still. But they must be so set as not to pucker or raise a ridge. Trim off all loose threads from the right side, lay the darn face down upon a blanket, cover it with a damp cloth, and press very hard with a heavy, hot iron. If the darning is well done, it ought to be invisible for at least three months after the pressing.

Silk ravels so it is ill to mend in any fashion. It may be darned zigzag and last, but wears the usual appearance of premeditated poverty. In darning the yawning rents of children's stockings, it helps to stretch coarse net over the holes, catch it on around the edges with a few basting-stitches, then weave the darning through its meshes. But for knees, and sometimes for heels, patching is better than darning. Cut the worn place square, and big enough to cover the knee-cap, ravel out the stitches at top and bottom, and make roll-hems down the sides. Do the same things to the patch, first fitting it exactly. Whip the hemmed edges together, and join the ravelled ones, by sewing rather loosely through a stitch at a time in each side. This makes a seam nearly as elastic as the stocking, and gives that article a new lease of use.

Rugs and carpets can be darned to manifest advantage. Lay a bit of stout but sleazily woven woollen upon the wrong side of a rug, fasten down the frayed edges with casual stitches here and there, then darn thickly back and forth, using the largest-size embroidery needles and either wool, silk, or flax of a harmonious colour. Darn threadbare spots in a carpet on the floor with ravellings in a fine curve-ended upholsterer's needle. If there are moth-eaten spots in Moquette or Turkey carpets, match

the colours as near as possible in soft fine wool, cut the wool into short lengths, and sew the tufts to the carpet with fine twist or flax, drawing the stitches so tight the wool stands up each side. When the spot is well covered with the tufting, trim it smooth with very sharp shears. Stair-carpets may be darned across the worn places, filling them with coloured wool, and then tacked, so the darns come on the rises, not the treads.

To inset a patch in a carpet on the floor: Mark the limits of the patch before taking up that part, cut it out as soon as loose, and match the figure in the patch by it. Leave the patch an inch-and-a-half bigger all round. Cut through the corners of the hole diagonally for three-quarters of an inch, double back the cut edges, and seam in the patch. Press the seam hard with the heaviest iron at hand before tacking down.

Chapter *EIGHTEEN*

War Knitting, Red Cross Needlework

THERE are certain terms used in knitting that are peculiar to the work. Until these terms are studied and practised, the instructions are as bad as trying to read a foreign language that you know nothing about.

Knitting is usually done on two needles though there are times when more needles are used, for instance, in knitting stockings.

Thread, silk or worsted can be used for the work. The latter is best for practising the first stitches or pieces.

The first term we learn in knitting is "to cast on stitches." Select a pair of medium-sized wooden needles. Your worsted should be wound into a ball. "Casting on" is the foundation for the work. Take a knitting needle in each hand between the thumb and first finger. Make a loop of the worsted over the left-hand needle near the end. Put your right-hand needle through this loop under the left needle. Holding the needles in this position, throw the worsted around the point of the right-hand needle and draw the right-hand needle through the first loop. There is now a loop on each needle. Slip the last loop made over the left needle. *Both needles are in the one loop, the left on top

of the right. Again throw the worsted over the point of the right-hand needle and draw the needle through with the loop on it. Slip this loop over the left-hand needle and repeat from*, till the number of stitches desired are cast on.

The * indicates from which point the directions are to be repeated.

The German method of knitting is to hold the work in the left hand and the worsted over the first finger, under the second and third and then over the little finger.

To knit, the right-hand needle is in the first loop from the point of the other needle.* Throw the worsted over point of the right-hand needle and draw it through the loop. Slip the first stitch off the left needle and insert the right needle into the next stitch and repeat from *, till all the stitches have been transferred to the right-hand needle.

Remember to hold the work in the left hand when starting to knit each needle or row.

To purl. The work is held in the left hand. The worsted is brought in front of the work. The right-hand needle is inserted through the stitch from right to left in front of the left needle. Pass the point of the right needle over the worsted and draw the loop through. Slip off the stitch on the left needle as in knitting. Repeat in this manner until all the stitches are transferred.

Sometimes it is necessary to get rid of some of the stitches. In that case the needle is slipped through two stitches instead of one and the new stitch formed in the usual way. There are two abbreviations for purling two together. They are p. 2 tog. or p-n. The latter means purl narrow.

When knitting, two stitches can also be taken together. The abbreviation for this is n. K. 3 tog. means knit three stitches (sts) together as one stitch.

To slip-stitch means to take a stitch from the left-hand to the right-hand needle without knitting it, and its abbreviation is sl.

To bind or cast off means to slip the stitches from the

needle so that you have a chain edge. Slip the first stitch and knit the second. You now have two loops on the right-hand needle. * Put the point of the left needle (from left to right) through the first stitch on the other needle. Hold the worsted tight. Slip the right-hand needle through the loop formed as described above and then slip the loop from the left needle. There is only one loop on the right-hand needle. Knit the next stitch and repeat from *.

Casting off must be done loosely or the work will have a puckered appearance.

It may be that you desire to widen the row of stitches. Both widening and decreasing is done at the end of needle or row. Knit as usual till there remains but one loop on the left-hand needle. Insert the left-hand needle through the loop at the base of the last stitch. Bring worsted around the point and make a stitch as usual. The last stitch is knitted in the usual way.

After you have practised the stitches with wool, it is well to buy a ball of coarse knitting cotton and a pair of steel needles. The cotton makes excellent wash cloths. Cast on 50 stitches then knit or purl the same amount of rows as stitches. To make a fancy cloth knit three rows, then purl three rows until you have the fifty rows.

*Knitting Bed Socks

Materials Required: Worsted Knitting Yarn, 1 Hank. One Pair Bone Knitting Needles No. 4

Cast on sixty stitches. Knit two stitches, purl two stitches all across row. Repeat for 17 inches long. Then knit one row, purl one row, knit one row, purl one row.

*For the knitting and surgical dressings instruction contained in the remainder of this chapter, the Editor is indebted to the "Manual of Voluntary Aid" published by a Committee of the Women's Section of the Navy League, Washington, D. C

Knit one row narrow (by knitting two stitches together) every fifth stitch. Purl one row, knit one row. Purl one row. Knit one row, narrow every fourth stitch. Purl one row, knit one row, purl one row. Knit one row, narrow every third stitch. Purl one row. Knit one row, narrow every second stitch. Purl one row. Knit one row. Narrow every second stitch. Then bind off and sew up with worsted.

Socks

Materials Required: Six ounces Three-Ply Yarn. Four No. 11 Knitting Needles

Cast on sixty stitches, twenty stitches on each of three needles.

Work, in rib of knit two and purl two, for thirty-two rounds.

Work 11 inches in plain knitting with no shaping.

For the heel put thirty stitches on the first needle, then equally divide the remaining stitches (required for the instep) on the second and third needles—both of which should be left until the heel is finished.

On the thirty stitches knit, alternately plain and purl, thirty rows, always slipping the first stitch. To turn the heel, knit eighteen, slip one, knit one, pass the slipped stitch over the knitted, turn, purl eight, purl two together, turn, knit eight, slip one, knit one, pass the slipped stitch over the knitted, turn, purl eight, purl two together, turn, knit eight, slip one, knit one, pass the slipped stitch over. Continue working in this manner until all the stitches are worked in, leaving the nine stitches on the needle under the heel, knit the two center stitches together.

For the instep, follow on with the first needle, and knit up thirteen stitches on the side of the heel; knit on to the second needle the thirty stitches which were left for the instep when commencing the heel; then, with the third

needle, knit up fifteen stitches on the other side of the heel while adding four from the first needle.

Knit two rounds plain, then begin the decreasings, knit the third and fourth stitches together from the end of the first needle, and, on the third needle, knit two, slip one, knit one, pass the slipped stitch over the knitted. Do this in every third round until there are fifteen stitches on each of the first and third needles. Knit without shaping until the work measures 7 inches from the heel.

For the toe,* knit to the last three stitches on the first needle, knit two together, knit one; on the instep needle, knit one, slip one, knit one, pass the slipped stitch over the knitted, knit to the last three stitches, knit two together, knit one, on the third needle, knit one, slip one, knit one, pass the slipped stitch over the knitted one, knit to the end of the needle.

Knit one round plain.

Repeat from * until the toe is reduced to twenty-four stitches.

Divide the instep and foot stitches equally on to two needles.

Turn the sock inside out and cast off the two needles together.

Sleeveless Sweaters

One-half pound wool.

Set up 72 stitches. Knit 2, purl 2, for 4½ inches. Knit plain 55 ribs. Knit 24 stitches for shoulder, leave on needle and bind off 24 stitches for neck. Knit 24 stitches, knit 4 ribs—for shoulder, break thread leaving a short piece of worsted on the neck end of the 4 ribs. Start opposite shoulder and knit four ribs. Cast on 24 stitches for neck. Knit 24 stitches on left on the first needle. Knit 55 ribs. Knit and purl 2 stitches for 4½ inches. Sew sides together, leaving about 9 inches not sewed together for armhole.

Finish sweater with a very narrow firm edge crocheted around arm hole and neck.

Helmet, With Cape Piece

Cast on thirty stitches.

Knit plain and increase once at the beginning of each row until fifty stitches are on the needle.

Knit five more inches in plain knitting.

Leave this piece on the needle, and knit a second piece exactly like it.

Now place the two pieces together, dividing the stitches on to three needles. Take a fourth needle and work in rounds, in ribbing of knit 2 and purl 2, for four inches.

Slip the twenty stitches from the center of one of the Cape pieces on to a thread and leave these for the opening for the face. Knit plain backwards and forwards on the remaining stitches, for sixty rows, always slipping the first stitch.

For the shaping at the top of the helmet, knit fifty-three, slip one, knit one, pass the slipped stitch over the knitted, turn, knit twenty-eight, slip one, knit one, pass the slipped stitch over the knitted, turn, repeat from knit 28, until all the stitches are worked in, leaving the twenty-nine stitches on the needle. Break off the wool and commence again where the twenty stitches were left on the thread. Knit them in the rib as before; take another needle, follow on and, working in rib of knit two and purl two all around the face, knit up thirty stitches along the edge of the sixty plain rows; with a third needle, knit across the twenty-nine stitches at the top of the face and knit two of the stitches together to make the rib fit in exactly; then with a fourth needle, knit up thirty stitches at the other side of the face.

Work sixteen rounds in rib of knit 2 and purl 2.

Cast off.

Mufflers

Cast on 50 stitches.
Plain knitting for 58 inches.

No. 5 celluloid needle. Dark blue knitting yarn—½ pound.

Wristlets

Cast on 50 stitches.
Knit two, purl two for 12 inches.

Sew up, leaving two-inch space for thumb four inches from top.
No. 3 bone needles. Gray knitting yarn.

Body Belt

The following instructions are for a belt knitted in two pieces, but if preferred without a seam, simply commence with 200 stitches, on four needles, stocking fashion, while following the same general directions.
For one-half cast two stitches on the No. 10 needles.
Work in rib of knit 1 and purl 1, for 5 inches.
Cast off very loosely and sew up the two side seams neatly with the wool.

Surgical Dressings

The following general directions are given:
The first given dimension is always measured along the selvage. A thread must always be pulled to cut by to insure accuracy. Every dimension denoted "Wide" must be cut lengthwise along gauze, and selvage must be removed before rolling. Remove loose threads or ravellings, as they are dangerous if left in a wound. All cut edges must be turned in. All but wipes have selvage placed to tight hand. Rolls and drains must have selvage cut off.

Gauze Bandages

2 inches wide, 10 yards long.
3 inches wide, 10 yards long.
4 inches wide, 10 yards long.

Bandages should be wound tightly on a bandage roller.

Gauze Compressss or Pads

9 by 9 inches finished.

Place selvage to right hand; fold cut edges to middle, making 9 inches wide; fold selvage ends to middle, making 9 inches wide; fold selvage ends to middle; fold once more making a 9-inch square.

4 by 4 inches finished.
Cut 18 by 18 inches.

Fold like the 9 by 9 inch compress with 1 more fold to make it square.

Gauze Rolls

3 yards by 4 inches.

Cut 3 yards long by one-half the width of material (about 18 inches). Cut off selvage; turn ends in 1 inch; fold cut sides to middle, making about 8 inches wide; fold again making about 4 inches wide; fold one end over 1½ inches; roll firmly and evenly; turn end in as when beginning and tie with selvage.

1 yard by 4 inches—made in either of two ways, (a) or (b).

(a), Cut 16½ inches on selvage by width of material (about 36 inches). Fold cut sides to middle, making about 8 inches; fold again, making about 4 inches; roll firmly and evenly, tie with selvage. Do not turn under selvage edge.

(b), Cut 1 yard by one-half the width of material (about 18 inches). Cut off selvage and fold like 3-yard roll.

Gauze Wipes or Sponges

4 by 4 inches.

Cut 12 inches by one-half the width of material (about 18 inches). Place selvage end farthest from you; fold other end over to selvage; fold side next to you over to selvage; fold ends over 4 inches, or one-third of length, making a 4-inch square; fold lower selvage layer over others (like turning a glove); fold double layer back over others, having all cut edges folded in.

2 by 2 inches.

Cut 6 inches by one-quarter the width of material (about 9 inches.) Fold like 4 by 4 inch wipes. (May use pieces without selvage but fold in the same way).

Gauze Drains

2 inches by 2 yards.

Cut 2 yards long by 8⅛ inches.

Cut off selvage; turn ends in ½ inch; fold cut sides to middle, making about 4 inches wide; fold again making about 2 inches; fold one end over 1 inch; roll firmly and evenly; turn in end as when beginning and tie with selvage.

1 inch by 2 yards.

Cut 2 yards long by 4⅛ inches.

Cut off selvage; turn ends in ½ inch; fold cut sides to middle, making about 2 inches wide; fold again making about 1 inch; roll firmly and evenly; turn in end as when beginning and tie with selvage.

½ inch by 1 yard. Made in either of two ways. (a) or (b)

(a) Cut 2¼ inches on selvage by width of gauze (about 36 inches).

Fold cut sides to middle making about 1-inch wide; fold again making about ½-inch roll; roll firmly and evenly; tie with selvage. Do not turn under selvage end.

(b) Cut 1 yard long by 2¼ inches.

Cut off selvage; turn ends in ½ inch; fold cut sides to middle making about 1 inch wide; fold again making about ½ inch; fold one end over ¾ inch; roll firmly and evenly; turn in end as when beginning and tie with selvage.

Gauze Laparotomy Pads with Tapes

12 by 12 inches.

Cut 24 inches by the width of material (about 36 inches).

Place selvage to right hand; fold cut edges to middle, making 12 inches wide; fold selvage ends over 12 inches, or ⅓ of length, making a 12-inch square. Sew around edge (making seam ⅛ inch) and quilt from corner to corner. Cut tape 18 inches and double; hold selvage tight to right hand and sew tape on upper right-hand corner.

6 by 6 inches.

Cut on selvage 18 inches by one-half width of material (about 18 inches).

Place selvage to right hand. Fold farthest edge one-third distance toward you, fold nearest edge toward the fold making a strip 18 by 6 inches; fold twice again having selvage on top and making a 6-inch square. Sew around edge (making a seam ⅛ inch) and quilt from corner to corner. Cut tape 18 inches and double; hold selvage side to right hand and sew tape on upper right-hand corner.

4 by 16 inches.

Cut 18 inches by the width of material (about 36 inches.)

Fold selvage ends together; fold selvage back to folded edge, making four thicknesses about 8 inches wide; turn ends in 1 inch; fold edges together with selvage inside, making 4 by 16 inches. Sew around edge making seam ⅛ inch. Cut tape 18 inches and double; hold selvage side to right hand and sew tape on upper right-hand corner.

Oakum Pads

7 by 11 inches, and not more than 1 inch thick when finished.

½ inch thick layer of oakum (from which remove all sticks or hard knots. Fluff slightly and spread well into corners); ½ inch layer of absorbent cotton (must be absorbent); 1 to 3 thicknesses of Turkish toweling, bedspread or similar thick material. Wrap very snugly in coarse meshed gauze (cut 24 by 24 inches) so that the lapped edges are not on the oakum side. Tuck in the ends between the cotton and base.

Fracture Pillows

13 by 17 pillows.

Stuff full with raw cotton, cotton batting or clippings of gauze or old muslin. The lighter in weight these are the better.

Knitted Wipes or Sponges

Dexter knitting cotton No. 8, three ply.

Knitting needles No. 4, Amber or equivalent.

Cast on 35 stitches.

Knit two ribs (over and back in one rib.)

Knit one stitch, put thread over needle, knit next stitch and repeat to end of work.

Knit the knitted stitch, drop the thread over the needle and repeat to end of work.

Knit two rows and repeat instructions until you have ten of the double rows and nine of the single large mesh rows, and finish.

Wrap each package of dressings in cotton cloth, bleached or unbleached. This may be new or clean, undamaged old cotton cloth, or linen sufficiently large to completely cover the dressings. Place package of dressings in such a manner that one layer of the cloth will completely cover the top portion of the dressings, bringing the other side halfway across the top and folding under the raw edge. Allow sufficient material at the ends to bring to the top, and pin

securely, being careful that no portion of the pin is exposed other than the head.

Comfort Bags

Bags should be made of washable material and may contain any or all of the following articles, size of bag 10 by 13 inches, with draw string at top:

Black sewing cotton, No. 30
White sewing cotton, No. 30
Black darning cotton.
Needles, No. 5.
Darning needle.
Needle case.
Buttons, black and white, medium size.
Large thimble.
Blunt-pointed scissors.
Cake of soap.
Safety pins, medium size.
Common pins.
Small comb.
Tooth brush.
Tooth powder.
Small round mirror.
Handkerchiefs.
Lead pencil.
Writing pad and envelopes.
Playing cards.
Collapsible aluminum drinking cup.
Pocket knife.

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THE COUNTRY LIFE PRESS
GARDEN CITY, N. Y.